Chemical Age

O.E.E.C. SURVEYS EUROPE'S CHEMICALS
(page 131)

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THE WEEKLY NEWSPAPER OF THE CHEMICAL INDUSTRY

INDEX TO ADVERTISERS

The first figures refer to advertisements in **Chemical Age Directory & Who's Who,** *the second to the current issue*

(*Continued on page 124*)

NATURE'S CATALYSTS (6)

Fertilizer from the Air

Between 1730 and 1738, 'Turnip' Townshend introduced the Norfolk four-course rotation to British agriculture. In this system of rotation, a crop of clover or other legume was used to enrich the fields, making possible a higher yield of wheat in the following year. The reason for this was established in 1862, when it was found that a species of bacterium infests the roots of legumes, and frequently gives rise to enormous numbers of gall-like nodules upon them. This bacterium contains an organic catalyst that fixes atmospheric nitrogen and converts it into valuable nitrogenous salts.

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INDEX TO ADVERTISERS

The first figures refer to advertisements in **Chemical Age Directory & Who's Who,** *the second to the current issue*

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most women, in *all* income groups, prefer goods packed in GLASS

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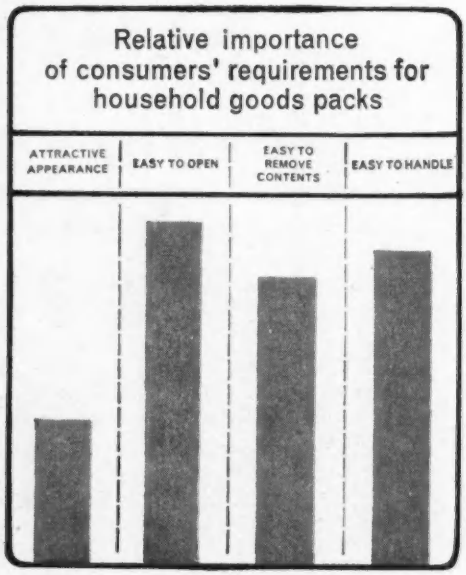

See how good things are in GLASS

VOL. 83 No. 2114
JANUARY 16 1960

CHEMICAL AGE

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116 Hope Street, Glasgow C2. [*Central* 3954-5]

IN THIS ISSUE

Annual subscription is: home, 52s 6d, overseas, 60s, single copies 1s 6d (by post 1s 9d)

CHEMICALS OR STARVATION

AGREEMENT by the manufacturers of alkali arsenites to cease production for their use in this country as haulm destroyers and weedkillers, was announced by Mr. John Hare, Minister of Agriculture, when he recently addressed the 47th annual meeting of the Somerset National Farmers' Union. He added that after this year's potato harvest the agricultural and ancillary industries would withdraw these arsenites from agricultural use. This voluntary ban will not apply to sheep or cattle dips, or to the use of lead arsenate on fruit trees.

The Minister added that this withdrawal and non-manufacture would be carried out on a voluntary basis. He also hoped that although use of the materials would continue for another season, full use would be made of publicity to warn against the inherent dangers in their use and that the agricultural chemical manufacturers would be able to push ahead with the development of substitutes. He paid tribute to the Association of British Manufacturers of Agricultural Chemicals and to the National Farmers Union for the responsible and co-operative way in which they had joined in the negotiations.

This voluntary agreement follows the lead given by Fisons Ltd. in October (see CHEMICAL AGE, 10 October, 1955, p. 479) and the recommendation of the Advisory Committee on Poisonous Substances that these chemicals should be voluntarily banned. The Minister then held urgent consultations with the organisations concerned; the agreement is to the credit of all concerned, reflecting as it does the industry's public spirit in accepting what must be a sacrifice.

We have referred before to the increasing unfavourable comment in the national press on the use of chemicals in agriculture and the need for the industry to initiate a campaign putting its own point of view to the public. A start has now been made with a statement by Mr. George Huckle of Shell Chemical Co. Ltd., and chairman of the Association of British Manufacturers of Agricultural Chemicals, who says that little or no prominence has been given to the industry's point of view. Mr. Huckle refers to press allegations that crop protection chemicals have "Upset the balance of nature". "Decimated the bee population", "Denuded the countryside of plant and animal life" and the fact that "one responsible professional journal" had even linked radioactivity with agricultural chemicals on farm crops.

Mr. Huckle then speaks of the careful examination of chemicals by the Ministry's expert committee before they are marketed, and the fact that if thought necessary, safety precautions are laid down and voluntarily accepted by the industry. He points out that this scheme was, of course, suggested by the chemical manufacturers themselves.

"This", he says, "is the chemical age; Sputniks, atomic power stations, man-made fibres and plastics could not have happened but for the chemist and chemical engineer. Similarly, it would not be possible to feed the millions of people of this world without chemical aids. Crop protection chemicals and other agricultural chemicals are here to stay. The alternative must be starvation for millions now living on this planet".

It would not be the people of the backward countries who would suffer most, but those living in densely populated areas such as West Europe, where the standard of living demands the maximum yield from every acre under cultivation. In fact the civilised world must learn to live with agricultural chemicals or revert to a food rationing system far more rigid than was ever seen during the war. The ration, needless to say, would be in the form of weevil-infested flour, scabby and maggoty fruit, and disease- and pest-ridden vegetables.

Crop protection chemicals are at the stage where 50 years ago, the man with the red flag preceded the car, thinks Mr. Huckle. These chemicals are the tools of the progressive farmer; not to use them would be to spell out hunger and misery for millions. If insects developed unchecked they could master the world, transmitting dangerous diseases and killing crops overnight.

The loss of crops caused by weeds, pests and disease was estimated at about £140 million of produce a year, or as much as 10% of the total value of U.K. farm produce.

It is to be hoped that this statement will be the first of many and that subsequent announcements will deal with different aspects of the problem. Ideally an association statement should follow each spate of unfavourable and ill-informed press comment.

CHEMICALS BY RADIATION

COMMERCIAL production of large-volume organic chemicals by nuclear processes is expected within the next 15 years, say Hercules Powder Co., U.S. Gaseous new materials pumped into a fission reactor can undergo hydrogen abstraction of the basic organic molecules, which then dimerise. Nitrogen fixation, too, is possible through nuclear fission, report Hercules. In fact, this latter possibility is now being checked by U.S. Atomic Energy Commission.

Chemicals have been made by reactor techniques but existing reactor designs make these products prohibitively expensive where stoichiometric quantities of free radicals are required. Now Hercules scientists have evolved, based on 10 years' research, a new type of reaction design which promises to produce ethylene glycol, for example, at a competitive price. Key to the new process, states Hercules research director Dr. Robert W. Cairns is the use of fragment recoil energy of nuclear fission (see p. 140).

According to Hercules nuclear chemist, Dr. Arthur F. Martin, in the ethylene glycol synthesis, methanol vapour is dimerised through free radical reactions brought about by recoil energy produced when fission occurs in enriched uranium oxide powder. This process yields ethylene glycol greater than 65% and uses only 10 thermal kWh per lb. of product. The operation would start with powdered enriched UO_2 fed into a methanol gas stream moving at about 40 feet per second under 20 atmospheres pressure. In a "cavity reactor"—basically an empty, 200 cu. ft. chamber lined with graphite or beryllium oxide as reflector-moderator—criticality is achieved. Kinetic energy of fission recoil shakes protons loose from methanol molecules which then combine to form ethylene glycol. Cyclone separators remove fuel dust, and glycol is recovered.

This continuous prototype, Hercules emphasise, has not yet been reduced to practice. Reactor engineering will take another five years at least before a prototype can be built. In the proposed process enriched UO_2 powder (roughly 40% U^{235}, 60% U^{238}) is fed in subcritical amounts into the methanol vapour stream before it enters the bottom of the circulating-dust reactor. In this, uranium mass becomes critical, and fission takes place. Fast neutrons go into the reflector lining inside the reactor where they are thermalised-moderated to slow neutrons, which then re-enter the cavity.

The reacted gas stream is divided as it leaves the top of the reactor into six streams to avoid criticality in the lines. These in turn divide further in a manifold system and flow into 50 or more cyclones where 90% of the suspended dust is removed and recycled. The gas stream passes through a heat exchanger. Glycol product is recovered and the unreacted portion (about 90%) of methanol vapour returns to the process.

Addition of small amounts of chlorinated hydrocarbon increases the yield from about 50% to as high as 67%. Some 7 to 9% of formaldehyde is formed which can be recovered for a credit. The other 25% or so of reacted carbon goes to form CO, CO_2, C_2H_6 and C_2H_4; also 3 to 4% of hydrogen gas is produced.

Hercules consider that this process will be economical for ethylene glycol, it promising a "small, but positive, return on investment". In addition, the magnitude of a heat credit—from low-pressure steam or electricity produced by heat from atomic fission—will depend on where the plant is located.

With no help from the U.S. Atomic Energy Commission or other Government sources, Hercules have put "hundreds of thousands of dollars" into this decade of research. The company estimates costs for a 100-million lb.-a-year glycol plant including a reactor capacity of some 150 thermal megawatts, at $20 million to $30 million; it is therefore offering the process to the chemical industry generally.

U.S. CHLORINE OUTPUT

CHLORINE output in the U.S. in 1959 is expected to total about 4.2 million tons, an increase of 17% over 1958 and almost 7% better than the previous record in 1957. The industry is also operating now well above 80% of capacity. Producers in the U.S. believe that demand for chlorine will continue during 1960 and there may even be more chlorine-caustic soda plant expansions. Annual chlorine capacity in the U.S. is stated to be over 5 million tons.

The U.S. chlorine industry is not in complete agreement about the likelihood of chlorine expansions in 1960. Reason for this not so optimistic view is the relatively low return on investment that chlorine brings; a 100-ton-per-day plant—the smallest that is practical at present—costs $8 to $10 million. Revenue from such a plant is put at about $5 million a year. Hence companies hesitate to set up further chlorine facilities until the capacity-to-demand ratio is higher.

Chlorine which between 1925 and 1950 grew at an average rate of 12% a year, is now moving into the 'mature' chemicals class. By 1965, it is predicted in the U.S., production will be of the order of 6 million tons a year, a 40% increase over 1959.

Chemical manufacturing takes 83% of U.S. chlorine output, but much of this is captive production. Pulp and paper uses are reported to account for about 13% of demand and sanitation for some 3%, although growth in all the above end uses is expected. The next few years are expected to see some changes. Chlorine for the paper and pulp industry, for instance, is expected to lose to chlorine dioxide and hydrogen peroxide. Of the chlorine used in chemicals manufacture to date, about 80% is estimated to go to organics and 20% to inorganics. In future, more will go to inorganics and less to organics. Explanation for this is the trend to the direct oxidation process for making ethylene oxide and ethylene glycol and Shell's synthetic glycol process which by-passes chlorine. Further, unless important new chlorine-based insecticides are developed, U.S. producers suggest that the percentage of chlorine taken up by insecticides will fall.

O.E.E.C. Reviews Europe's Chemical Industries in 1958-59

29% Rise in Demand for Petrochemicals

DEMAND for European chemicals on world markets did not change appreciably in 1958. After rising by 7% in 1956 and 13% in 1957, O.E.E.C. countries' exports to overseas territories, the Dollar Area and 'other countries' increased by only 2% in 1958 and accounted for about 13% of O.E.E.C. countries' total chemical production. This is stated in the latest report of the Chemical Products Committee of the Organisation for European Economic Co-operation (O.E.E.C.) in their survey "The Chemical Industry in Europe 1958-1959" (1958 and some information on developments during the first six months of 1959).

"1958 saw a slowing down in the expansion in industrial activity which began in 1953. Total industrial production was stable compared with 1957, and exports fell slightly. By the last quarter of the year, however, the situation was improving and the upward movement was maintained in the first six months of 1959 when the seasonally adjusted production index was 3% higher than in the same period of 1958.

"Industrial production in the United States in 1958 was 7% lower than in 1957. The upturn which did not make itself felt in Europe until the fourth quarter of the year was already apparent in the United States in the third quarter, and in the first six months of 1959, production was 15% higher than in the first half of 1958."

Turnover of the chemical industry the report estimates at $15,100 million in 1957 and $15,200 million in 1958. (The small difference in these figures is due to the devaluation of the French franc.) As there was a small increase in the balance of international trade it would appear, the O.E.E.C. committee state, that the supply of chemical products for consumption within the O.E.E.C. area rose appreciably in relation to general economic activity in 1959.

The chemical industry's share of the product of manufacturing industries for the O.E.E.C. countries combined has been estimated at 9% ('structure of European Economy in 1953'). The corresponding figure for engineering industries was about 35%, the agricultural and food industries about 20% and textiles and clothing about 12%. Since this study was made some changes have taken place and the relative importance of the chemical industry has grown.

TABLE I

Countries	C.I.'s share of gross domestic product at factor cost	C.I.'s share of product of manuf. industries at factor cost	C.I.'s share of total labour force
Belgium ...	2.0	6.1	1.4
Denmark ...	1.3	4.0	—
France ...	2.5	9.6	1.2
Germany ...	3.8	9.3	1.4
Ireland ...	0.7	2.7	0.4
Italy	3.9	12.3	1.0
Netherlands ...	2.2	5.3	1.3
Norway ...	2.1	7.9	1.1
U.K.	2.6	7.3	1.5

Trend in Chemical Demand. In the last O.E.E.C. report it was estimated that 15% of the gross output of the chemical industry was exported to non-member countries. This estimate was rather high and exports in fact accounted for 13% of total chemical production in 1958. Of the part of the gross output consumed in Western Europe rather more than a third is accounted for by sales of basic chemicals, about 30% represents demand for products for direct consumption, and the remainder is accounted for by sales to other industrial sectors.

Within the basic chemical group demand for petroleum chemicals rose most rapidly in 1958, since, with no appreciable change in stocks, output (in terms of carbon content) increased by 29% over 1957 after having risen by 34% in the previous year. Demand for inorganics is stated to be difficult to assess since little information is available; in some cases, for example, alkali output was lower than in 1957. As no large stock changes are reported it is assumed that demand followed the same trend.

Demand for plastics materials was even higher in 1958 than in the two previous years. After rising by about 21% in both 1956 and 1957 consumption is estimated to have increased by 24% in 1958.

After increasing appreciably in 1957 over 1956, demand for dyestuffs fell sharply in 1958; much more sharply than the fall in output in the main consumer industry, textiles, since textile manufacturers let their stocks of dyestuffs run down last year. The decline in estimated consumption was greater in tonnage than in value owing to an increase in the quantity of better quality dyestuffs used.

Estimated consumption in the paint and varnish sector rose by about 6% in 1958 over 1957 compared with 7% in 1957 over 1956.

In the soap and detergents sector estimated consumption remained unchanged for the second year in succession in 1958, although it is believed there was some increase in terms of active content since the consumer is turning more and more to products with greater washing power.

Demand for nitrogenous fertilisers on O.E.E.C. home markets rose by 7% in 1958-59 or at the same rate as in 1957-58. Some slowing down is expected in the two following years when consumption is forecast to increase by 6% annually. Demand for phosphate and potash fertilisers rose by 3% in 1958-59 after a quicker rate of increase in consumption in 1957-58 (5% for phosphate and 7% for potash fertilisers). A higher rate of expansion than in 1958-59 is expected in 1959-60.

Growth Sectors. In Table II gross output of eight sectors of the chemical industry in 1954 and 1958 are shown for six O.E.E.C. countries and the U.S. These eight sectors accounted for 55% of total gross output of the six O.E.E.C. countries' chemical industries in 1958. In both regions the pharmaceutical and plastics materials industries have had the greatest proportionate increase over the last few years.

Production Trends. Increase in production of chemicals was by no means common to all countries in 1958. Production rose by 14% in France (16% in 1957 over 1956), and by 7% in Germany and Italy (12% and 14% respectively over 1956). In B.L.E.U. and the U.K. output was lower in 1957, declining by 6% and 1% respectively. Output of chemicals in the U.S. remained unchanged in 1958 after having risen by 4% in 1957 and 6% in 1956.

Capacity Fully Used

Capacity for the production of petroleum chemicals and plastics materials was, by and large, fully used in 1958, the O.E.E.C. report indicates. In most branches of inorganic chemical industry capacity was less fully used than in the organic chemical sector.

About 87% of nitrogen capacity was used in 1958-59 and about 90% of potash capacity. For some types of phosphate fertiliser the percentage was considerably lower, falling to about 70% of capacity for superphosphate, due to competition for newer types of fertiliser.

The extent to which dyestuffs capacity was used must have been even lower than in the past, it is considered.

Capacity for production of synthetic detergents appears to have been fully used in 1958, and new plant is still being built in certain countries. Probably rather less than 50% of capacity for soap manufacture was used in 1958, however.

Employment. The 6% increase in O.E.E.C. countries' chemical production was achieved with a much smaller increase in the labour force.

	1955	1956	1957	1958
Chemical production	111	119	131	139
Labour force 1950=100	105	108	110	192

Chemical industry's labour force is estimated at 1.42 million persons in 1958, of whom 430,000 were administrative, technical and clerical staff, and nearly 1 million operatives. While the labour

force in 1958 was 1.9% higher in 1957, the number of administrative, technical and chemical staff employed rose by 3.4%. This same phenomenon was noted in the U.S., where about 821,000 were employed in 1958 in the chemical industry or 1.5% less than in 1957. With increasing automation in the industry, technical personnel employed is likely to rise.

Basic Chemicals. With information available for six key-products, the O.E.E.C. report shows that output expanded less rapidly than in the previous year. Rates of expansion for products such as chlorine and calcium carbide which find a major outlet in the organic chemical industry are higher than for other organics. The high rate of increase in production of primary ammonia (9% over 1957) with its main outlet in the nitrogenous fertiliser industry should be noted.

In the organic chemical industry, benzene consumption in three countries (France, Germany and Italy) was 45% higher than in 1957, ethylene consumption in France and Germany 34% higher, acetylene consumption in these same two countries, plus Belgium 28% higher and naphthalene consumption, while showing a slower rate of growth in five countries (Belgium, France, Germany, Italy and Sweden), rose by 19%.

While output in the organic chemical industry increased more rapidly than chemical production in general in 1958, the most marked expansion was in the production of organics from oil and natural gas—petrochemical output was up 29% over 1957.

Dyestuffs production fell by 15% in tonnage and 11% in value in 1958, after increasing by 11% and 14% respectively in the previous year.

While output in the paint and varnish industries is still expanding, the rate of increase, on the whole, has been slower than in previous years, i.e. paints and varnishes +5% (+6% in 1957), printing inks +6% (+8%) and mastics +5% (+2%).

Information on the rate at which output of medicinal and pharmaceutical products is expanding is not generally available. Turnover of the pharmaceutical industry increased, however, by 7% in Germany and 6% in France in 1958 over 1957.

In the soap and detergent sector output of soap fell by 9% in 1958, having already declined by 5% in the previous year. Synthetic detergent production rose sharply (by 11%), however, in 1958 as against the 1957 increase of only 7%.

Rate of expansion in the production of fertilisers in O.E.E.C. countries (including Spain) varied little in 1958-59 with the exception of phosphate fertilisers from the previous year. Marked progress was shown in phosphate output, from −1% in 1957-58 to +3% in 1958-59.

Plastics materials output (in terms of producers sales) rose by 15% in 1958 over 1957, compared with 19% in 1957 over 1956. O.E.E.C. total sales reached over 1.6 million tons. Sales of thermoplastics rose by 20% to 780,000 tons, but the increases in sales of thermosetting plastics and cellulose derivatives were lower (12% and 10% respectively).

Investment in 1958. Investment in chemical industry in nine countries which account for about 90% of the value added by the chemical industry amounted to $1,080 million in 1958 compared with $1,050 million in 1957. Investments in other O.E.E.C. countries can be estimated at $100 million. Investment in the petrochemical industry accounts for an increasing part of total investment in chemicals. $230 million were invested in petrochemical plant which came into operation in 1958, and in the three years from 1959 to 1961 it is planned that nearly $840 million on new plants or extensions to existing pant will be spent.

Chemical Trends in 1958-59

- **Demand for petroleum chemicals rose by 29% over 1957 after having risen by 34% the previous year.**
- **Due to lack of information demand for inorganics is difficult to assess. Alkali output, however, was lower.**
- **A 24% increase in consumption is estimated for plastics materials as against 21% in both 1956 and 1957.**
- **Sharp fall noted for dyestuffs in 1958 in so far as tonnage was concerned.**
- **A 6% increase in the estimated consumption of paint and varnishes as against 7% in 1957 over 1956.**
- **Estimated consumption in soap and detergents sector unchanged.**
- **Nitrogenous fertiliser demand in O.E.E.C. area rose 7% in 1958-59, i.e., same rate as in 1957-58.**
- **Demand for potash and phosphate fertilisers rose by 3% in 1958-59 (5% for phosphate and 7% for potash fertilisers in 1957-58).**

TABLE II

Gross output of some sectors of chemical industry (in million dollars)

	Six O.E.E.C.			*United States*		
	1954	1958	%change	1954	1957	%change
Dyestuffs	457	522	+14	793	1,069	+35
Tanning extracts and syn. tanning materials	16	21	+31	—	—	—
Paints, varnishes etc.	726	965	+33	2,046	2,374	+16
Medicinal and pharmaceutical products	926	1,330	+44	1,704	2,309	+36
Soap and detergents	649	855	+32	1,520	1,812	+19
Fertilisers (manuf.)	970	1,267	+31	863	887	+3
Explosives	236	282	+20	390	320	−18
Plastics materials	611	1,017	+66	1,231	1,775	+44
Total	4,591	6,259	+36	8,547	10,546	+22

TABLE III

Gross investment by 9 O.E.E.C. countries* (as % of total investment in manufacturing industries and construction)

	1954	1955	1956	1957	1958
Chemical industry	9.8	8.8	9.6	9.5	10.0
Petrochemical Industry	0.5	0.2	1.0	1.2	1.5

* B.L.E.U., *France, Germany, Italy, Netherlands, Norway, Sweden and U.K.*

Detailed information is not available for all countries with regard to investment in the plastics materials industry in 1958, but it is estimated that three major producers of plastics materials, France, Germany and the U.K., together invested about $200 million.

Investments were also made in the pharmaceutical industry where special attention was given to investments in the production of antibiotics and vitamins.

Some countries are noted as investing in the inorganic chemical industry, in particular, in nitrogenous fertilisers, chlorine and calcium carbide.

In the U.S. expenditure on new plant and equipment in the chemical and allied products sector amounted to $1,320 million in 1958 as against $1,724 million in 1957.

International Trade in Chemicals. After increasing by an average of about 11% in each of the three years 1955, 1956 and 1957 trade between O.E.E.C. countries remained relatively stable in 1958. Imports from overseas territories fell in 1958, owing to a decline in European demand for tanning materials and essential oils. Exports to overseas territories were stable during 1957 and 1958. Imports from dollar countries increased more than imports from any other source in 1958. B.L.E.U., the Netherlands, Norway, Portugal and Switzerland, however, imported less from the dollar area in 1958 than in 1957. Greek imports rose by 87%, while Germany's chemical imports from the dollar area reached $94 million in 1958 compared with $69 million in 1957 and $49 million in 1956.

U.S. exports of chemicals to O.E.E.C. countries show that as in the last few years, exports of organic chemicals and pharmaceutical products are increasing rapidly. U.S. exports of styrene to O.E.E.C. countries, for instance, amounted to over $11 million in 1958 and phthalate esters (excluding dibutyl and dioctyl) to $7 million. Exports of poliomyelitis vaccine rose to nearly $10 million in 1958, whereas in 1957 exports of vaccines for human use amounted to only $3.3 million.

(To be continued)

Big Rise in U.K. Chemical Production Index

Index of all U.K. industrial production in September 1959, based on a 1954 average of 100, stood at 117 (107 in September 1958). Index for chemicals and allied industries for the same month was 132, compared with 116 in August and 117 in September 1958. Third quarter figure for all industries was 105 (98) and for chemicals and allied industries 122 (108).

Project News

Humglas Win Contract for World's Largest Oil Gasification Plant

● AN order to install an oil gasification plant in Osaka, which will eventually be the largest of its kind in the world, has been won by Humphreys and Glasgow Ltd., London, in association with their Japanese licensees. By the end of this year, four units each making 5 million cu. ft. of town gas a day will be in operation. Cost of this installation will be about £700,000; eventually further units will bring capacity to 30 million cu. ft. a day.

The plant, ordered by Osaka Gas, will use the Humglas Onia-Gegi process, which enables town gas to be produced from a wide range of hydrocarbons, including heavy fuel oil. Special equipment exported from Britain will include catalysts, hydraulic automatic control equipment and oil burners. Close collaboration with the Japanese companies, Ishii Iron Works and Okura Trading will be maintained during constructional and engineering stages. The rest of the plant will be manufactured by Ishii Iron Works to Humglas designs. The commissioning will be under the supervision of an H. and G. engineer.

The new plant will be the third Onia-Gegi installation in Japan. Two smaller units, each producing 500,000 cu. ft. of gas per day were recently commissioned at Yaizu and Himeji and are now operating.

● Received by the Power-Gas Corporation (Australasia) Pty. Ltd., a member of the Power-Gas Group, is an order from Sulphide Corporation Pty. Ltd., a wholly-owned Australian member of the Consolidated Zinc group, for supply and erection of the charge handling plant for a new smelter being erected at Cockle Creek, near Newcastle, N.S.W.

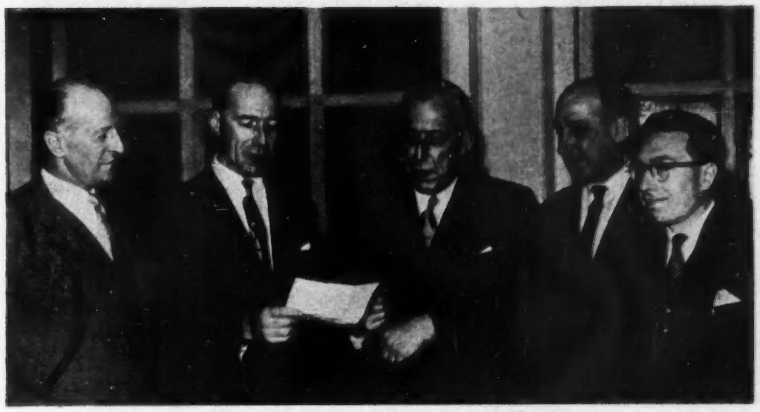
Value of the order is about £A300,000, and installation is to be completed by the end of 1960. The new smelter, an improved vertical-furnace type developed by Consolidated Zinc's main U.K. subsidiary, Imperial Smelting Corporation, will utilise the blast furnace principle to produce zinc and lead metal simultaneously.

● CONTRACT for extensions to existing Boby automatic base-exchange water-softening plant at the North Lindsey Water Board has been awarded to William Boby and Co. Ltd., of Rickmansworth, Herts. The contract, valued at £18,500, will bring the plant's capacity up to 150,000 gall./hr.

Marchon Craftsmen Walk-out

Some 200 craftsmen belonging to five unions are reported as having walked out of Marchon chemical factory at Whitehaven, Cumberland, last week in support of their claim for a 1s-an-hour increase. The stoppage was unofficial.

Chemical Productivity Rises at Twice Rate of all U.K. Industry



At the annual meeting of the Chemical and Allied Trades Section, Manchester Chamber of Commerce, are, l. to r., H. G. Young (Hardman and Holden), G. Innes (I.C.I.) and section chairman, E. D. Carey (I.C.I.), H. Warne (W. Blythe and Co.) and E. Tomlinson, hon secretary

"THE impressive growth of the British Chemical Industry over the past decade has continued in 1959 with a further expansion of production and with increased exports which will reach record figures. Such outstanding results can be readily understood upon examination of the rate of capital investment over this period." This is stated in the annual report of the Chemical and Allied Trades' Section, Manchester Chamber of Commerce.

"Investment in new plant and equipment for the chemical and allied industries has risen spectacularly from £38 millions in 1948 to £160 million in 1958, the latter figure accounting for no less than 17% of capital expenditure in that year in all manufacturing industry." In that decade capital chemical investment amounted to £1,175 millions. While almost all sections of the industry had contributed to that figure the greatest steps had been made in petrochemicals, which had risen to such an extent that that was second in size only to the U.S.

Production within the chemical industry had kept pace with the sustained high rate of investment.

It had been calculated that the productivity of the chemical industry was progressing at twice the rate of the manufacturing industry as a whole and now stood at over 60% above that for 1948. That increase had been accomplished with only a 22% rise in the labour force.

The U.K. was the third largest exporter of chemicals. Competition was particularly severe from West Germany which had consistently taken a larger share of world chemical exports. Outstripping the U.K. in 1954, her exports were second only to the U.S. whose share since 1952 had remained steady at about 28.5%.

The movement towards free trade in Europe was confidently awaited by the U.K. chemical industry. West Europe was the world's largest market for chemicals; a market which was still rapidly expanding. At present British chemicals to that area accounted for some 28% of the total.

"In view of this, the political manoeuvring between the proposed European Free Trade Association and the European Economic Community will be most anxiously watched," the report states. "It is important that chemical exports to the E.E.C. which are higher than those to the rest of Europe are safeguarded, and to this end it is hoped that the creation of an E.F.T.A. will provide the necessary bridge to an association with the E.E.C. In any event the position augers well for future trade with Europe.

"Until such time as the two groups come to some understanding with regard to trade reciprocity, the progressive dismantling of tariffs in the E.F.T.A. (to commence 1 July, 1960) will afford the U.K. chemical industry an increasingly wider advantage over West Germany whose chemical exports to the 'Outer Seven' have far exceeded the U.K. figure. Meanwhile this situation would be reversed in the E.E.C. and it will no doubt be the policy of the U.K. industry to overcome such difficulties by establishing branches, companies and joint manufacturing and merchanting enterprises inside the Common Market."

To prophesy the future was a difficult task, but it may be confidently anticipated that the continuance of a wise policy of investment and research, combined with the industry's natural assets of versatility and efficiency, will bring further successes, and there is every likelihood that established export markets will continue to expand while new demand will be created by industrialisation in more backward countries. Chemical production is assuming growing importance throughout the world and in consequence competition from other countries is developing fast. With this in mind there is real need to avoid any tendency towards complacency.'

Mr. Gilbert Innes was re-elected chairman at the a.g.m. on 8 January.

★ A SASSENACH chemist suggested to me, after reading a statement connected with utilisation of the surplus potato harvest in Scotland, that surely the Scots farmers have heard of poteen —the manufacture of which was, he thought, vastly more interesting than any other conceivable product from this basis.

The need for a 'revision of policy' on the subject of chemical processing of surplus potatoes, made recently by Sir Thomas Wedderspoon, a leading exponent of chemical treatment of seed in Scotland, presumably refers to the sterilising of seed potatoes for the export market, a process which broadens the scope of this class of business because of foreign import regulations. There is of course, in the commercial sense, virtually no alcohol extraction from potatoes in the U.K., and has not been since other sources of ethyl alcohols became abundant.

But I have it on good authority that a foul tasting distillation (evocative of fusel oil and isobutyl alcohol) can be wrested from surplus potatoes down on the croft, a beverage whose merrymaking potentialities are, however, equal if not superior to those of Scotch, even if it falls short of the genuine production on grounds of taste. Such alchemy is, of course, strictly against the law.

★ 'DO-IT-YOURSELF' industrial detergents is the theme of two new technical bulletins that reach me from Cyclo Chemicals Ltd., Manfield House, Strand, London W.C.2. These bulletins, which give suggested formulae and manufacturing instructions, are entitled 'Make your own synthetic detergent at half the cost with Cycloryl ABSA' and 'Formulation of liquid detergents with Cycloryl ABSA'.

This product is dodecyl benzene sulphonic acid, supplied virtually 100% pure. Its salts are the active ingredients of almost all the nationally advertised detergents, both liquid and powder. Current trend, however, is for the detergent user to formulate and manufacture his own product. Now that the free dodecyl benzene sulphonic acid is available at such a high concentration, this has become a simple and economic process. The 'do-it-yourself' way cuts raw material costs and gives greater freedom in formulation.

★ ACCORDING to New Scotland Yard there is no such thing as the perfect murder. But Dr. B. C. Saunders, an authority on toxic compounds and lecturer in organic and inorganic chemistry at Cambridge, thinks otherwise. He is convinced that the perfect murder could now be committed by using F.E.A. nerve gas in the liquid form.

Addressing scientific intelligence officers at Cambridge last week he said "You could put this in a person's beer or cocoa and he would not know the difference because this gas is odourless, colourless and tasteless. There is a delayed action of 20 minutes and then after a slight convulsion the person is dead."

He added that a post-mortem examination would reveal no unusual chemicals present in the body. And that is as near the perfect murder as anyone is likely to get!

★ I WAS intrigued to learn from Deosan Ltd., an associate of Diversey (U.K.) Ltd., 42 Weymouth Street, London W.1, of their new liquid dairy detergent, described as "an entirely new formulation". This was developed from the combined Diversey-Deosan research laboratories in their efforts to find a perfect liquid detergent for farm dairies.

The company is not prepared to reveal these ingredients, but I am told that this is the first detergent to make combined use of them. They will not say more than that the "product differs from usual detergents in that it is a blend of surface active agents that has not been used together previously".

The active constituents will not separate out even at temperatures as low as the freezing-point of water, although ice crystals may form. The product is compatible with Deosan hypochlorite at "usual use concentration". It replaces the company's previous liquid detergent at no extra cost, and is said to have greater emulsifying power.

★ A NEW Geigy booklet, which is based on a series of advertisements run by the company in 1958-59, should find a place on the shelves of a collector interested in works on modern abstract art.

Relating to semi-technical explanations of the nature and methods of formulation of the Geigy range of dyestuffs and pigments are Kandinsky-like reproductions in full colour accompanied by fragmentary commentaries such as; '. . . Predominant is toluidine red, derived from *meta*-nitro-*para*-toluidine and β-napthol; and the best available toluidine red is Irgalite Fast Scarlet RNP, a new version which combines maximum brilliance and opacity with exceptionally good texture and easy dispersions."

Especially pleasing, I think, to the eye is the illustration accompanying the short treatise on 'Specialities'—the final section on pigments which do not fit into the more conventional groups of the earlier sections. Here we enter the exotic (and expensive) world of cable compounds and plastics pigments, wherein electrolyte content and other problems have been superimposed on those of light, heat and solvent fastness.

★ I LEARN that the million-plus share offer of Brockville Chemicals Ltd., Canada, reported briefly in CHEMICAL AGE on 2 January (p. 20), presages construction of a synthetic ammonia and ammonia derivatives plant at an estimated cost of about $20 million at a site which Brockville have acquired adjoining the Maitland works of Du Pont of Canada, and that a contract with the latter covers Du Pont's entire requirements of ammonia and hydrogen at the Maitland works.

Largest single shareholder of Brockville is reported to be Sogemines Ltd., an investment, holding and management company of Montreal, major shareholders of which are a group of Belgian entities headed by Societe Generale de Belgique, who in turn have substantial interests in the Belgian chemical industry through affiliated companies, including Soc. Carbochimique.

In Canada a group headed by W. C. Pitfield and Co. Ltd. is expected to offer over half a million 6% participating preferred Brockville shares at $10 par, together with $5 million worth of first-mortgage series, while the remainder will be subscribed for privately. An interesting sidelight on this news is that, at present, the company has no intention of entering the field of mixed fertilisers.

★ THEIR £16½ million share bid for Pinchin Johnson (p. 148) could make Courtaulds one of Britain's two biggest paint manufacturers—the other is I.C.I. Already Courtaulds have acquired through their Group Developments, the paint company Cellon Ltd. and last month, signed an agreement for exchange of development and manufacturing techniques and paint formulae with Glidden International, a subsidiary of the Glidden Co. of Cleveland, one of the U.S.'s leading paint manufacturers. Tying in with these paint interests is, of course, the petrochemicals plant at Spondon which Courtaulds took over when British Celanese were acquired. This plant produces the important solvents used in paint manufacture, as well as vinyl acetate, and can also make alkyd and polyester resins used as binders.

With the acquisition of Pinchin Johnson, Courtaulds would acquire a 20% holding in Styrene Co-Polymers, whose other partners (each holding 40%) are Berger Group and Petrochemicals Ltd., the Shell subsidiary. Shell have the U.S. licence for the new one-coat alkyd epoxy resins derived from styrene. Paint production in the U.K. is closely reflecting the level of industrial production and sales for the first nine months of last year were some 8% up on 1958 at 68 million gall. Sales last year, in fact, are believed to be a record. In going into paint manufacture, Courtaulds are entering a growing market and one which will give a good outlet for their chemicals and expanding production.

Alembic

B.I.P. Chemicals' New Formaldehyde Plant

Dehydrogenation of Methanol Over a Silver Catalyst

FIRST stage of the planned expansion of B.I.P. Chemicals Ltd., manufacturers of aminoplastic mouldings powders and resins, has been carried through with the operation of the new formaldehyde plant at Oldbury, Worcs, where an initial capacity of 75 tons a day of 37% material has been installed.

The process selected uses methanol as its starting point, the only other route used commercially, i.e. from hydrocarbon gases, not being economic unless the plant is situated close to a source of natural gas, or a petroleum refinery or cracking plant.

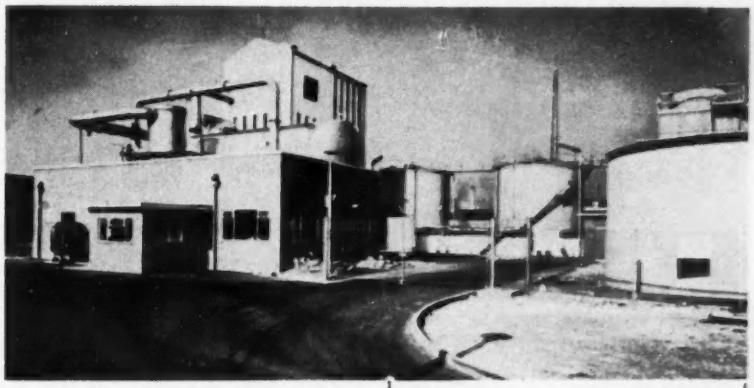
Two alternative routes from methanol are available, one consisting of oxidation using a mixed metallic oxide catalyst, the other of dehydrogenation over a silver catalyst. With the oxide catalyst a high conversion is possible giving at good yield a formaldehyde having a low methanol content. Equally good yields are obtainable with a silver catalyst, but it is necessary to distil if a low methanol content is required. It was decided to use a silver catalyst in the form of electrolytically deposited silver granules. The catalyst, which has to be refined to a high standard of purity, is very susceptible to poisoning, particularly from iron, and precautions have to be taken to ensure the necessary purity of the three raw materials—methanol, steam and air.

Self-contained Unit

The plant was designed by Mr. K. E. Nickels, B.Sc., M.I.Chem.E., and manufactured and erected by Leonard Smith (Engineers) Ltd. It forms part of a self-contained unit on a site placed centrally in relation to B.I.P. Chemicals' three factories. The complete layout includes storage for methanol and formaldehyde, a cooling tower, refrigeration plant and electric sub-station.

Basic design of the plants is similar to that of conventional silver catalyst plants already in existence, though a number of refinements to improve yield and reduce the overall consumption of utilities have been incorporated.

Air is drawn first through a nylon filter, then through an electrostatic precipitator before being sent by a centrifugal blower through a bubble cap column round which methanol is circulated. The air is thus cleared to prevent poisoning of the catalyst and substantially dried to prevent dilution of the methanol in the vapouriser, through which it is then bubbled. The rate of production of the plant is determined by the rate of flow of air, which is automatically controlled.



Main entrance to the formaldehyde plant at Oldbury

Methanol is pumped from storage into a steam-heated mild-steel vapouriser, the level of methanol in which is kept constant by a level controller. The temperature of the methanol is automatically controlled and determines the methanol/air ratio which in turn determines the catalyst bed temperature. The mixture of methanol vapour and air is super-heated and mixed with an automatically controlled quantity of clean filtered steam.

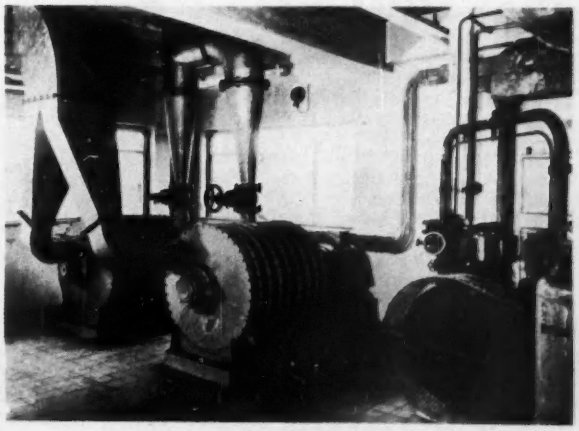
Methanol-air-steam mixture then passes through a flame trap into the convertor where it passes downwards through the catalyst bed consisting of a shallow layer of silver crystals spread on a copper gauze, the operating temperature being in the region of 600-650°C. Hot gases from the convertor are immediately quenched in a vapour cooler which is fed with condensate and which generates steam at 30 p.s.i., and enough steam is generated to supply process requirements.

From the vapour cooler the gases pass through a condenser having stainless steel tubes filled with earthenware rings. The temperature of the cooling water from the condenser is automatically controlled and this water circulates through a heat exchanger in the vapouriser and thereby effects a useful economy in the consumption of steam. Uncondensed gases from the condenser are led to the bottom of a bubble cap scrubber, each tray in which is provided with water cooling coils. Liquid product from the condenser is fed to the scrubber on the third tray from the bottom.

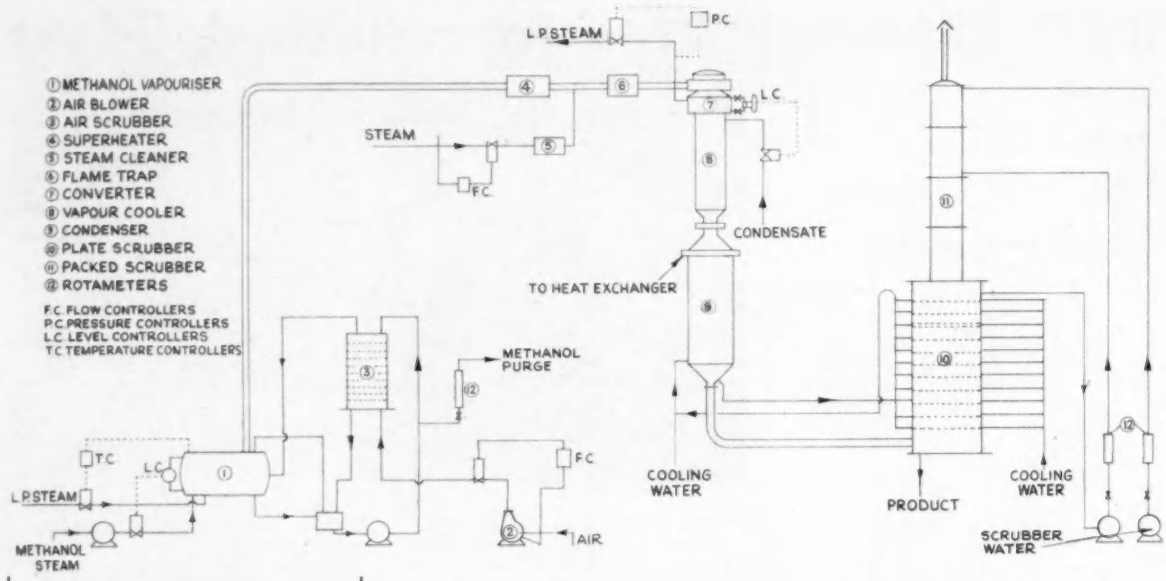
Surmounting the plate scrubber is a packed scrubber through which the gases pass to atmosphere. A controlled flow of water is pumped to the top of this scrubber, which consists of two sections, part of the liquor in each section being continuously recycled. From the bottom of the plate scrubber the product is pumped to product tanks mounted on weighing machines, where it is blended and adjusted to strength before being pumped away to final storage.

At certain times of the year the cooling water temperature may exceed the permitted maximum, and to deal with these conditions a refrigeration plant has been installed to circulate chilled water on a closed circuit through part of the cooling system.

Methanol is delivered in road tankers and stored in three vertical mild-steel tanks which together have capacity of 1,000 tons. These tanks are bunded and safety precautions include fixed-foam injection systems (in each tank) and pro-



Two of the air blowers with part of the refrigeration plant on the right



Simplified flowsheet of B.I.P.'s Formalin plant at Oldbury

vision for flooding the outside of the tanks in case of fire. Storage for 400 tons of formaldehyde is provided in two reinforced concrete tanks lined with acid-resisting brick. From this storage formaldehyde is distributed to the moulding powder and resin factories by stainless steel pipelines.

All the controlling and recording instruments, together with the pump switches, are mounted on an instrument panel in the central control room from which the plant is operated. Adjacent to this is a small laboratory in which the routine testing is carried out by the plant operator. The automatic controls on the plant have ensured extremely steady operating conditions and the plant is operated by one man per shift, with one man on day shift to handle receipt of methanol and distribution of formaldehyde.

Since methanol is highly inflammable and can form explosive mixtures with air, strict fire and safety precautions have been taken. Safety devices on the plant eliminate the risk of explosion and the plant itself is housed in an open-type structure to prevent pockets of methanol vapour being formed. All electrical equipment within the plant and adjacent to the methanol storage tanks is flameproof, while the building which houses the blower room, control room and laboratory is pressurised.

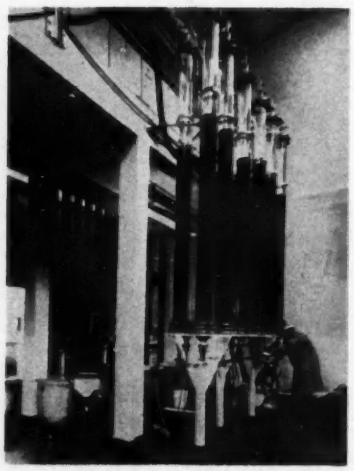
New Automatic Plating Installation

Commissioning of a new automatic plating machine at their Haydock (Lancs) factory, has been carried out by Thomas Crompton and Sons Ltd., manufacturers of ironmongery for the aircraft, building, marine, automobile, railway and other industries. The new plant, which in an eight-hour shift plates up to 30,000 parts with nickel or chromium, was supplied and installed by Electro-Chemical Engineering Co. Ltd., of Woking, Surrey.

High-purity Rare Earths Commercially Available From Johnson Matthey

RARE earth elements have been supplied by Johnson Matthey and Co. for some years. Recently, application of ion exchange techniques for the production of these rare earths in a state of high purity has been developed in the company's research laboratories and has allowed their production in large quantities, in various grades of purity, and at much lower cost than hitherto.

The outstanding feature of the rare earth group is the chemical similarity of ite members, this in turn being due to the unusual similarity of the basic electronic structure of their atoms. This close similarity in chemical behaviour has made their separation an unusually difficult problem. Now as a result of Johnson Matthey's research and development work, all the rare earth elements, except element 61, can now be supplied in a state of high purity, not only as oxides and salts but also in the metallic state. Most of the oxides are available also in lower grades at correspondingly lower cost.



Some of the ion exchange resin columns in the Johnson Matthey plant

Common metallic impurities are held at a very low level. The impurity content of other rare earth metals is generally of the order of 0.1%. In scandium, lanthanum and cerium, the rare earth impurity is confined to less than 0.01%. All of the sixteen metals have been remelted into ingots or rods. Lanthanum, cerium, neodymium, praseodymium, yttrium and gadolinium have been successfully extruded, and subsequently drawn to give wire.

Just issued by Johnson Matthey is a publication "Products of the Rare Earth Group", which describes the properties, characteristics and availability of this interesting range of materials. This is available on request to the company's head office at 73-83 Hatton Garden, London E.C.1.

No Change in U.K. Chemical Price Index

WHOLESALE prices in the chemicals and allied industries showed no change in November, according to the Board of Trade's monthly price index. The November index was 104.9 (based on a 1954 average of 100), a 0.2 rise over the same month of 1958.

	Nov. 1958	Oct. 1959	Nov. 1959
Chemicals and allied industries:			
Total sales	104.7	104.9*	104.9*
Home market sales	105.8	106.6*	106.6*
General chemicals ...	107.3	106.4	106.3*
Pharmaceutical chemicals	82.1	81.8	81.8*
Soap	124.2	128.8	128.8*
Soapless detergents ...	103.8	103.6	103.6*
Synthetic resins and plastics materials ...	91.7	90.0	90.0*
Commodities Wholly or Partly Imported			
Pyrites, c.i.f., United Kingdom ports ...	74.1	64.9	64.9*
Sulphur, crude (for acid making), c.i.f. ...	80.0	77.4	77.4

* Provisional.

PHYSICAL SOCIETY EXHIBITION

Chemical Age Reviews Developments in New Instruments and Equipment

MANY new developments in instruments for industry and research will be featured at the 1960 Physical Society Exhibition which is to be held in the Royal Horticultural Halls, London S.W.1, from 18 to 21 January. As in previous years these will include new production models as well as prototypes. Some of the new exhibits which will be shown are reviewed below.

Nitrogen Purification

The A.E.I. Research Laboratory, Aldermaston, will demonstrate on the stand of the **Associated Electrical Industries Ltd.**, a thermoelectric recording hygrometer, a dew point hygrometer, in which thermoelectric refrigeration may find an application. The refrigerating thermocouple made from p- and n-type bismuth telluride cools a mirror, and when dew forms on this it is detected optically.

A.E.I.-Birlec Ltd., Birmingham, are to show new laboratory equipment for the drying of gases to moisture content of 1 p.p.m. by the use of molecular sieves, together with a simple dew-point apparatus for use down to −50°C. The design and construction of a new type of nitrogen purification plant for the provision of super purity nitrogen will be demonstrated by means of animated flow diagrams. Compressed commercial nitrogen, containing free oxygen, is passed over a bed of heated activated copper which removes the oxygen as copper oxide, the residual oxygen content being in the region of 10-20 p.p.m. At the same time traces of carbon monoxide and hydrogen are removed. At suitable intervals the activated copper mass is reduced with hydrogen and re-used. To remove the majority of the carbon dioxide and water vapour present the nitrogen is passed, after cooling through a vessel containing sodium hydroxide pellets.

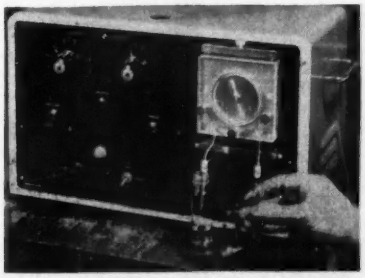
The plant design provides further reduction in the water vapour content to a dewpoint of −80°C by a molecular sieve adsorption unit. A Birlec molecular sieve dryer will be exhibited on the stand.

A selection of different probes used in a high resolution nuclear magnetic resonance spectrometer will be shown by the research laboratory of **A.E.I. (Manchester) Ltd.** The probes will illustrate three particular aspects of nuclear magnetic resonance spectroscopy, namely the observation of high resolution proton resonance spectra at 60 Mc/s, the use of large sample tubes, and the observation of spectra at different temperatures. The use of the 2 in. mass spectrometer, exhibited last year in two series of experimental investigations, will be illustrated. The spectrometer is a small compact instrument of the 180°C deflection type, employing a permanent magnet and with a resolving power of 50 and a mass range of 2-100.

A.E.I. Instrumentation Division is to demonstrate a production model X-ray microanalyser. This equipment, though basically similar to the experimental model shown last year, has new features including a calibrated handwheel-controlled chain drive to the spectrometer linkage to facilitate operation from a sitting position. The angle of tilt of the specimen turret has been increased to 30° to minimise X-ray absorption by the specimen.

New B.T.L. Instruments

New instruments developed by both the Analmatic and general instruments sections of the Research and Development Division of **Baird and Tatlock (London) Ltd.**, Freshwater Road, Chadwell Heath, Essex, include the B.T.L. Analmatic auto-titrator (motorised pipette type). This is an inexpensive fully-automatic titrator for process monitoring. It is capable of a variety of applications involving pre-set pH, 'dead-stop' and other potentiometric end-points. Titration is performed by a simple motor-driven syringe pipette



B.T.L. Analmatic proportioning pipette unit (peristaltic pump type)

coupled to a recorder pen, instead of the burette, automatic burette-reading mechanism and titrant normality compensator employed in the more comprehensive auto-titrators in the 'Analmatic' range.

The auto-titrator is housed in a steel cabinet and is constructed in four sections: Sequence unit and control panel; recorder unit (includes pH meter if required); titration unit, with titration vessel and reagent pipettes; reagent storage compartment.

The liquid to be sampled and analysed is conveyed to the instrument by a sampling pipeline from the source to be monitored. The auto-titrator for dissolved oxygen performs one complete Winkler analysis every four minutes.

B.T.L. Analmatic wide bore polarograph for dissolved oxygen in water employs the wide bore electrode developed at the Water Pollution Research Laboratory. It is suitable for field use in measuring and recording oxygen concentrations in the range 0-15 p.p.m.

B.T.L. Analmatic polarographic pre-treatment unit is designed for use in conjunction with an external polarograph for automatic process monitoring. It performs automatic repetitive sampling and pre-treatment of liquid from either of two process sources for polarographic measurement and recording of concentrations of various elements. The electrode system was devised by Dr. H. T. Tucker, Hartebeestfontein Gold Mining Co. Ltd., for polarographic monitoring of uranium refinery process liquors.

Other new units include a proportioning pipette (peristaltic pump type), for rapid repetitive dispensing of equal aliquots of liquid from one vessel into another; HCl gas analyser for the automatic measurement of HCl concentration in air; and automatic pipette for use in routine analysis where large numbers of measured "doses" of the same reagent or diluent are required daily.

Nephelometer Head

Evans Electroselenium Ltd., Colchester Road, Halstead, Essex, will have on display a range of newly developed EEL instruments, including the microphotometer, nephelometer head, recording flame photometer, Quantitrator and titrator amplifier.

The EEL nephelometer head has been designed to meet the requirements of those who wish to measure either samples of extremely low turbidity, or the turbidity of coloured solutions. This instrument, which supersedes the EEL nephelometer, operates in conjunction with the Unigalvo, type 20, and combines high sensitivity with the incorporation of optical filters. The samples are contained in ordinary test tubes and compared against a solid standard which is provided for day-to-day reference.

Gamma-ray Level Indicator

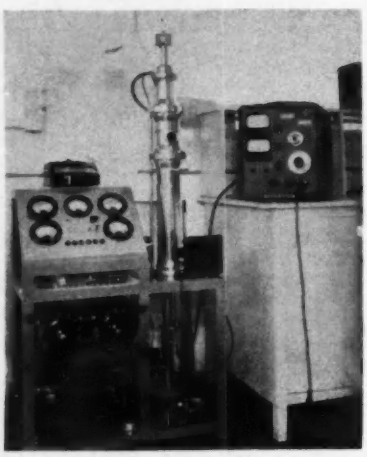
A gamma-ray level indicator equipment was originally developed by Salford Electrical Instruments Ltd. for the National Coal Board to provide remote indication of the level of coal within pithead and underground bunkers, but various types of γ-source and detector leads have been developed which allow it to be used for a variety of other industrial applications involving both solids and liquids. These are shown by the company on the group stand of the **General Electric Co. Ltd.**, Magnet House, Kingsway, London W.C.2.

A suitably shielded radioactive source projects a beam of gamma radiation which produces a relatively high count rate output from a detector unit placed within the beam at the required dis-

tance. Interruption of the beam leads to some absorption of radiation by the interrupting medium and a corresponding reduction in the count rate output from the detector.

Lead Titanate-Zirconate Piezoelectric Ceramics

Considerable progress has been made by the Chemical and Metallurgical Division of the **Plessey Co. Ltd.**, at Towcester, on ferrite materials during the last year and seven new grades of telecommunications ferrites with permeabilities from 700 to 2,500 will be shown.



Plessey prototype dielectric apparatus capable of measurements in the 1,000°C region

Due to the volatility of lead oxide, manufacture of lead titanate-zirconate piezoelectric ceramics presents some difficulties. During the past year, however, a commercially feasible manufacturing process has been evolved and this has enabled radial coupling coefficients of 0.5 to be successfully combined with permittivities of 1,500. It is now thought likely that high quality piezoelectric ceramic filters may soon be a practicable proposition from the manufacturing point of view. Demonstrations will compare the behaviour of the new lead titanate-zirconate with the old barium titanate material.

Ultrasonic Flowmeter for Liquids

The **British Scientific Instrument Research Association,** South Hill, Chiselhurst, Kent, will show an ultrasonic flowmeter developed for the National Research Development Corporation. The flowmeter is intended for measurement of flow of 'difficult' fluids which are not amenable to measurement by existing types of meter.

Such fluids may be highly corrosive, or contain suspended material which impairs the performance of meters which rely upon elements immersed in the fluid being measured. As the device is non-constrictive there is no head loss associated with the ultrasonic flowmeter.

The ultrasonic flowmeter has been designed primarily to measure the relatively slow flow rates encountered in industrial processes, and can be fitted to pipes between about 1½ in. and 12 in. diameter. The accuracy of flow measurement is about 1%. These figures are only intended as a guide; the meter can be 'tailored' to special conditions involving different pipe size and flow velocity, and under closely controlled conditions will be capable of greater accuracy.

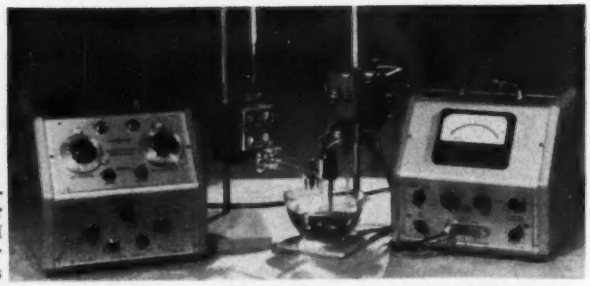
Vacuum-dome X-ray Spectrometer

The stand of **The Solartron Electronic Group Ltd.**, Thames Ditton, Surrey, will introduce more than 20 instruments new to the exhibition. Among them will be the Solartron vacuum-dome X-ray spectrometer, Type XZ.736. For the rapid analysis of materials, it can also be linked to a manufacturing process to provide a continuous analysis of the end-product and will analyse elements down to atomic No. 12 (carbon). A new pressure scanning valve is a precision multi-pressure line commutator which permits one pressure transducer to sense pressures at a number of points in a system or plant by sequential sampling.

Titrator-Controller

Latest edition of the Pye argon chromatograph will be demonstrated by **W. G. Pye and Co. Ltd.**, Granta Works, Cambridge, together with the complete range of accessories which has recently been developed. These include a variety of injection systems—some of unique design—for liquids and gases. Workers with specialised applications are catered for by the range of adapters available, designed both for inclusion in current production instruments and for incorporation in the hundreds of argon chromatographs now in use throughout the world. These adapters include 20 ft. and 50 ft. conventional packed column systems, capillary column adapters, and semi-preparative scale equipment.

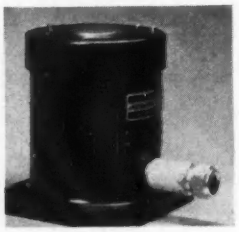
An automatic titrator-controller of new design will be demonstrated together with a Pye pH meter. The new instrument features two independent electronic relay circuits, each of which can be set up to operate at any point in the 1 milliamp input current range (e.g. 0-10 pH). The autotitrator-controller can be used for titrations, one channel controls 'fast flow' and the other 'slow flow' for a Pye delivery unit, a second titration application uses weak and strong titrant solutions, again controlled independently; a solution can be dosed when it is required to bring the pH value to a desired point or keep it at a desired point (e.g. while a reaction proceeds); a two-step on/off control scheme can be set up for laboratory, pilot plant and process applications using the autotitrator-controller to regulate reagent additions; the complete independence of the two control channels means that the pH value of a given solution can be maintained constant by the addition of either acid or alkaline reagent.



W. G. Pye's autotitrator - controller with universal pH meter set-up for routine titrations

Nobel Load Cells

Electrical weighing systems which use load cells are subject to errors caused by temperature effect, long term drift of the cell output, and creep with sustained loading. The Nobel load cell developed by I.C.I. and **Ericsson Telephones Ltd.**, Beeston, Nottingham, provides extreme stability against these effects, and is therefore suitable for use in locations where the system zero cannot easily be checked. The cells have an accuracy of ±0.25%, which is maintained over long periods without maintenance. The cells are suitable for use in multi-weighing installations, the output from a number of cells being fed to a single indicating instrument.



Ericsson's Nobel load cell

Scanning X-ray Microanalyser

Cambridge Instrument Co. Ltd., 13 Grosvenor House, London, S.W.1, will, due to space limitations at the exhibition, show their scanning X-ray microanalyser at the company's London showrooms. This provides a powerful method of qualitative and quantitative metallurgical analysis by the technique of irradiating a minute area of the surface of a metallic sample with a fine-focus beam of electrons, and analysing the resulting emission of X-rays excited in the sample. This type of analysis differs from most others because of its

non-destructiveness and its ability accurately to detect minute local differences in composition.

An important feature of the Cambridge microanalyser is the incorporation of a deflection system in the electron microscope so that the electron beam can scan the surface of the sample. The instrument is not, therefore, restricted to point by point micro-analyses but can also produce X-ray images showing, in turn, the distribution of selected elements over the area scanned.

Soil Density and Moisture Measurement

Soil density and moisture measuring equipment to be shown by **Dynatron Radio Ltd.,** Maidenhead, is designed to assist in the control of soil compaction. The density measuring system is composed of a Geiger tube and a source of gamma rays, and may be used with the source on the ground surface or at a suitable depth. The moisture measuring system consists of a BF3 proportional counter and a source of fast neutrons. A sealed 10 Mc/s radium/beryllium source supplies high-energy gammas and fast neutrons.

Gallium Arsenide Gives Wider Temperature Range

Texas Instruments Ltd., Dallas Road, Bedford, show many of the newer additions to their range of semiconductor devices as well as examples of new products still under development.

The gallium arsenide regulator diode is said to have an operating temperature range (from −65°C to +325°C) that is nearly double the range of any semiconductor device previously commercially available. The device exhibited is a voltage regulator in the 11 volt range and has a power dissipation of 800 milliwatts at 25°C, thus effectively doubling the power available from a standard subminiature glass diode. A full range of gallium arsenide devices is now under development.

Moisture in Fluorinated Hydrocarbon Oils

The research and development laboratories of **G. V. Planer Ltd.,** Windmill Road, Sunbury-on-Thames, will demonstrate the effect of the presence of moisture in high-density fluorinated hydrocarbon oils on their long-term properties, with reference to a new procedure of monitoring moisture content in these oils by a radioactive isotope method. (This work forms part of an investigation undertaken in conjunction with Ferranti Ltd., Edinburgh, under contract for the former Ministry of Supply.)

High-purity Metals for Semi-Conductors

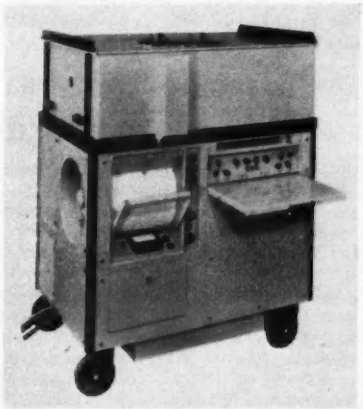
Johnson, Matthey and Co. Ltd., Hatton Garden, London E.C.1, will exhibit a wide range of pure metals, with series of alloys based on them, in a variety of forms. The metals include aluminium, antimony, arsenic, bismuth, cadmium, gallium, germanium, gold, indium, lead, mercury, platinum, selenium, silver, tellurium, tin and zinc.

In silvered mica capacitors the recently introduced S (synthetic resin protected) and R (phenolic-dipped) types and a number of new ranges—including the type H series, which are silicone-rubber protected units for operation over the temperature range −70° to +250°C, will be featured.

In addition to a range of silver metallising preparations formulated for firing on to refractory bodies, a new thermosetting silver preparation, FSP 36, enables conducting films to be applied to any body capable of withstanding a curing temperature of 100°C.

New Developments By Unicam

The SP.100 infrared spectrometer now in production is a new version of the instrument, state **Unicam Instruments Ltd.,** Cambridge. Changes have been made to increase still further the easy operation and maintenance. The spectrometer shown is a prism/grating double monochromator instrument with auxiliary slave recorder. A valve has been added to the vacuum system to isolate the evacuated optical system from the pumping line and the cold trap is now located conveniently in the pumping line.



SP.100 recording spectrophotometer

In the SP.900 flame spectrophotometer, improvements have been made to the atomiser which now features a metal capillary from which obstructions can be easily removed by a fine wire. The detector system has been rebuilt based on a single photomultiplier giving good sensitivity over the range 250-850 mu. The burner jet has been enlarged resulting in a hotter flame at high pressures and the igniter system has been re-designed.

H. and W. Prototype of Process-control Photometer

Prototype of a process-control photometer, developed by **Hilger and Watts Ltd.,** 98 St. Pancras Way, London N.W.1, to measure (continuously or intermittently) fluorescence and the absorption and scattering of light in a flowing liquid will be on show. The quality of a solution, the concentration of solid particles in it, and the effectiveness of filtering processes can be determined from these characteristics. The instrument can easily be incorporated in automatic control systems.

For atomic-absorption spectroscopy, an atomiser sprays sample solutions into a gas burner. Light from a hollow-cathode lamp passes through the flame and is measured by the Uvispek spectrophotometer. The lamp emits the spectrum of the element to be determined, and the Uvispek monochromator is set to pass a single line of that spectrum. The energy of the line is depleted by absorption in the flame if the element concerned is present in the solution. Atomic-absorption spectroscopy can be used for many elements where flame photometry is unsuitable. It suffers less from inter-elemental interference and needs fewer chemically analysed standards.

Platinum-coated Refractories

Unglazed ceramic bodies can be coated with a continuous layer of platinum metal by using special platinum preparations which have recently been developed by the Mond Nickel Co. Ltd., and will be shown by the Baker Platinum Division of **Engelhard Industries Ltd.,** 52 High Holborn, London W.C.1. The platinum is applied in a liquid form, then fired to burn away the vehicle and bond the platinum to the ceramic surface. Using this technique, layers of platinum of the order of five to ten thousandths of an inch can readily be produced. These films, which are bonded to the ceramic body, are not porous and can be used to protect the ceramic surface from corrosive agents such as molten glass.

Hydrogen will diffuse rapidly through heated palladium, but the metal is impervious to other gases which may be present in the hydrogen and this property has been used as the basis for the design of units for the production of ultra-high purity hydrogen.

The prototype paladium diffusion unit model number HPD-5-400B, to be exhibited will purify a maximum of 5 cu. ft. per hour of commercial cylinder hydrogen. Rapid deterioration of palladium takes place if the metal is allowed to be in contact with hydrogen during heating or cooling through a critical temperature range around 150°C, and an important feature of the unit is the series of interlocks provided which prevent this happening.

Refractory double-gob orifice ring and crucible coated with 'liquid' platinum by Engelhard Industries

PROTEIN FIBRES AS BASES FOR NEW HYDROGENATION CATALYSTS

INVESTIGATIONS into the suitability of the silk-palladium catalyst for general hydrogenation reactions are the subject of some recent papers by a Japanese research worker at Osaka University, Y. Izumi (*Bull. Chem. Soc. Japan*, 1959, **32**, (9) 932). A 6-nylon-palladium catalyst has also been prepared and assessed.

The silk-palladium catalyst was found by Osaka University investigators, S. Akabori, Y. Izumi, Y. Fujii and S. Sakurai, to be effective for the asymmetric reduction of certain unsaturated compounds. It was prepared by co-ordinating palladous chloride with silk fibroin fibres and then hydrogenating the complex. Low density, high ignition point and ease in handling are characteristics which recommend silk-palladium as a general hydrogenation catalyst. It is easily mixed with reacting substances and may be separated from them by simple filtration. The silk may be prepared as sheets, cloths or wool by spinning and weaving.

Preparing the Catalyst. The original silk-palladium complex was prepared by boiling silk fibroin fibres with an aqueous solution of palladous chloride. Izumi has found, however, that a 5% palladium content may be obtained by using a dilute acetic acid solution of the palladium salt (*Platinum Metals Review*, 1960, **4**, No. 1, 10). The resulting chelate is activated by reduction with hydrogen in an autoclave. Both the catalyst and its precursor, the silk-palladium chelate, are stated to be quite stable and may be stored for a long period without loss of activity. A value of 14.5 kcal./mol. is quoted for catalyst activation energy in the hydrogenation of nitrobenzene to aniline. 6-Nylon-palladium, prepared by a similar method has a lower palladium (content 2.3%) but also shows a high activity; activity is proportional to its palladium content.

Catalysis

The Catalytic Effect. In contrast to the original catalyst prepared from an aqueous palladous chloride solution, it does not achieve asymmetric catalysis. Aliphatic C = C double bonds are reduced at low temperatures in a selective reaction in which carbonyl groups remain unattached even at higher temperatures. The catalyst is therefore suggested for the preparation of saturated aldehydes and ketones from the corresponding unsaturated compounds. Aromatic C = C bonds are inert to the catalyst. Aliphatic carbonyl groups (except for α-ketoglutarate) are not susceptible and aromatic carbonyl groups are attacked. Aldehyde, nitrile and nitro groups attached to aromatic rings are catalytically hydrogenated as are azobenzene and some oximino groups, although there is a weak catalytic effect for aliphatic nitro groups.

Activity and Toxicity. After one run, Izumi reports, the activity of the silk-palladium catalyst is considerably increased and this higher activity persists for at least four more runs. Toxicity tests carried out during hydrogenation of nitrobenzene and diethyl maleate have shown that the silk catalyst is more seriously poisoned by ethyl mercaptan than is a palladium-carbon catalyst; no palladium, however, is extracted from the silk-palladium in contrast to a carbon catalyst. It is suggested that mercaptan inhibits the catalysts by direct blocking of the active palladium. Acetylation and the presence of ferric and cupric ions greatly lower the activity. It is thought that the metal ions form chelate linkages with the protein, so blocking the active palladium atoms distributed within the fibroin miscelles; acetylation may have a similar effect. Treatment with EDTA reactivates the catalyst poisoned by ferric or cupric ions and, it is claimed, produces a more active catalyst. Also, treatment of silk fibroin with acetic anhydride prior to preparation of the catalyst gives a strongly active product.

X-ray diffraction and infra-red spectrophotometry have been used to examine these new catalysts. Infra-red absorption measurements indicate that the NH, OH, COOH and CONA groups of the fibroin participate in the chelate formation. On reduction, the chelate linkages are broken and the palladium is then present in an atomic form. X-ray diffraction studies suggest that chelate formation does not significantly alter the arrangement of the fibres. Chemical reaction with *p*-nitrosodimethylaniline has confirmed the presence of some of the palladium of the complex in a readily reactive state while the remainder appears to be dispersed in the fibres structures.

Hercules Patents for Radically New Chemical Processes from Radiation

RADICALLY new chemical processes accomplished by nuclear reactor treatments are foreshadowed in reports received from Hercules Powder Co., U.S. Based on a design concept developed by Hercules scientists, a new type of reactor bids fair to make the production of commercial chemicals possible by nuclear treatment of basic organic raw materials. Preliminary cost estimates suggest that the economics of the process may be competitive with those of standard chemical manufacturing techniques.

Processes for making several widely used chemical products are disclosed in patents recently issued to Hercules, including Canadian Patent No. 576,979 and German Patent No. 1,045,403. British Patent No. 770,594 (20 March 1957) covers only general examples of research results. Research results on the new nuclear reactor and its products are to be published by Hercules shortly.

According to Dr. R. W. Cairns, Hercules research director, the new-type reactor makes it possible to produce, for example, ethylene glycol at a cost competitive with the normal method of production. This estimate is based on laboratory work at this stage.

Primary object of the intensive research programme which Hercules have pursued over the last 10 years has been to utilise the fragment recoil energy of nuclear fission to best advantage. Recoil energy represents about 80% of the total fission energy. Normally, this energy is absorbed in the fissionable fuel and its container. In special types of nuclear reactors with finely divided fuel, with particle diameters from 0.5 to 10 microns, however, this energy is available for chemical transformation. After the chemical synthesis, most of the energy is still available for electrical or thermal power generation.

Hercules believe the reaction is applicable to a wide range of organic chemicals. In general, however, it was found that chemicals of lower molecular weight tend to give higher yields of easily separable products. Yields of over 65% of ethylene glycol have been obtained from methanol using the Hercules process. (Methanol is currently selling in the U.S. at about 4½ cents per pound, and ethylene glycol at about 14 cents/lb.)

Chemico-Whessoe Agreement on CO Removal Plant

Collaboration is proposed between Chemico Construction (G.B.) Ltd., 8 Henrietta Place, London W.1, and Whessoe Ltd. for design and construction of Chemico catalytic carbon monoxide removal plants for town gas. Based on shift-reaction $CO + H_2O \rightarrow CO_2 + H_2$, the plants may be designed for low or high-pressure operation, with or without subsequent CO_2 removal; and most of the organic sulphur is converted to hydrogen sulphide, subsequently removed, providing town gas of reduced toxicity and low sulphur content.

1960 May be a Record Year for Fertilisers

THERE were indications that farmers intended to use more fertilisers than ever this year, stated Mr. J. W. Napier, first chairman and managing director of Fisons Fertilisers Ltd., this week.

"An easy harvest, good progress with autumn cultivations and an increasing awareness of the value of higher fertiliser usage had resulted in a heavy demand throughout the late summer and early autumn," he added.

Mr. Napier declared that "Improved services, new and better types of fertilisers, reduced prices and improved methods of application should result from the formation of Fisons Fertilisers Ltd., with assets of £27 million, on 1 January, when Fisons Ltd. became a holding company."

Mr. Napier is also a managing director of the parent company. He joined Fisons in 1939.

Overseas News

SWISS CHEMICAL INDUSTRY'S NEW RECORD EXPORT LEVELS

PROSPEROUS conditions which characterised Switzerland's economy last year were the result of record building activity and of marked improvement in the country's export trade. In fact exports of the important Swiss chemical and pharmaceutical industry attained a new high level, having risen by no less than 19% during the first three quarters of 1959 as compared with the same period of 1958. All sectors of the industry benefited from this favourable development, although rates of increase varied somewhat. However, the most marked increase of exports—by 35%—was registered by the dyestuff manufacturing industry.

Europe remained the foremost market, absorbing almost three-fifths of the entire dyestuff export. Because of the generally good business activity of the international textile industry, there was also an improvement in shipments to non-European markets, notably to African countries, which account for approximately 4% of Swiss dyestuff exports, whereas the markets of Asia and of North America absorbed respectively 16 and 8% of the total. Shipments of dyes to Australia and to Latin American countries showed the relatively smallest increases. Export prospects in this sector are considered to be good provided that the textile boom is maintained and that no pronounced structural changes in the mutual exchange of goods result from the existence of two preferential areas in Europe.

Exports of chemical auxiliaries for the textile, leather, paper, soap and plastics industries continued to expand in spite of severe competition. However, expansion of productive capacity led to a maintenance of pressure on prices.

A noteworthy increase of exports has also taken place in the Swiss pharmaceutical industry, the rate of increase last year being 13% (9.6%) and pharmaceuticals account in fact for 47% of chemical exports. Because of protective tendencies in numerous export markets, several Swiss enterprises decided to transfer certain phases of production abroad, hence increased importance is being attached in Switzerland to an unfettered transfer of licence fees, royalties, etc.

Germany to Aid Greece in Chemical Plants

Orders placed as a result of negotiations between Greek Government officials and German industrial interests under the German aid agreement include the following: to the Batelle-Institut, of Frankfurt-on-Main, order to plan soda installations and exploitation, planning to be carried out within a period of nine months at a total cost of DM161,500 and 154,000 Drachmae (together some £15,350); to the Institute for Cellulose-Chemistry, Darmstadt Polytechnic, planning for a cellulose/straw-based cellulose project, study to last six months and cost at the most DM62,000 (some £5,200); to the German concern Didier-Werke, planning of the setting-up of an industry for the manufacture of fireproof material, costs of study to be DM118,900 (some £9,910) and foreseen future costs of DM221,500 (about £18,460) for experiments in West Germany.

W. German/Roumania Chemical Trading Agreement

Under a trade agreement for the new year, just signed between the Governments of West Germany and Roumania, the latter will supply the Federal Republic with chemical products worth DM5.5 million (£460,000 approx.) and mineral oil products worth DM30 million (some £2.5 million). In the other direction, the Federal Republic will supply Roumania with chemical products worth DM28 million or about £2.34 million.

Chemical Expansion Schemes In Colombia

Several chemical schemes are included in the list of plans for new industrial enterprises and plant to be erected in Colombia during 1960. These include: plant for production of tannic acid on the Guajira Coast; expansion of the Betania soda plant near Bogotà; erection of new soda plant on the country's Atlantic coast; and building of two new polyvinyl chloride plants. One of these will be situated in Bogotà and erected with capital from the U.S. B. F. Goodrich concern, and the other in Medellin, a project of Sintéticos S.A. The two p.v.c. works will save Colombia some $1.6 million (U.S.) per year.

Silicon Carbide for Yugoslavia

Work is reported to have begun on the erection of a silicon carbide plant at Kratovo, in the Yugoslavian province of Macedonia. The plant will come into production in 1961, it is stated.

Roumanian Chemical Production Plans

Latest reports from Roumania state that in 1960 chemical production targets are to include the following (1955 output in brackets): sulphuric acid, 211,600 (92,000) tonnes; anhydrous soda, 207,200 (51,800) tonnes; caustic soda, 94,000 (23,500) tonnes; synthetic fertilisers, 292,500 (58,500) tonnes; and mineral oil, 13,600 (10,600) tonnes. Although no definite figures are given, it is stated that 1960 chlorine output is to be 450-550% above that of 1955, sodium compounds 200,000 tonnes more, plastics (excepting p.v.c.) 10,000 tonnes more, p.v.c. 15,000 tonnes more, synthetic fibres 16,000-17,000 tonnes more, synthetic detergents 15,000 tonnes more, carbon black 200% over the 1955 figure and tar dyestuffs 160-180% above 1955.

Maleic Anhydride Unit For Heyden Newport

Heyden Newport are going ahead with plans to build a 24 million lb.-a-year maleic anhydride plant at Fords, New Jersey. The plant will be designed and built by Scientific Design Co., and will use the Scientific Design process. The plant is due on stream late this year.

In the meantime, Reichhold Chemicals are completing engineering plans for their phthalic anhydride unit at Newark, Ohio. This 60 million lb.-a-year plant should be in production in late 1961.

Australian Plans for Salt Exports

Solar Salt Ltd. who have spent £500,000 in developing a salt undertaking near Port Augusta, South Australia, in 1959, plan to export salt, mainly to Japan. A subsidiary of the L. J. Hooker Investment Corporation of New South Wales, the company plans to bring more plant from Britain and West Germany. Most of the output, now at a weekly rate of about 1,500 tons, goes to New South Wales.

Continental Oil's Cyclohexane Plans

Cyclohexane is to be produced by Continental Oil Co. in Oklahoma in a $1 million plant at the company's Ponca City refinery. The plant will have a capacity of more than 20 million gallons a year.

Construction of the plant by Procon will start immediately, and completion is scheduled for September 1960. Hydrogen from the refinery's catalytic reformers will be used to convert benzene into cyclohexane.

Outlet aim for the cyclohexane to be produced is primarily the nylon market.

More Polyvinyl Fibre Production in Japan

At Kurashiki Rayon Co. Ltd. and Kanega-Fuchi Spinning Co., more Vinylon polyvinyl alcohol fibre will go into production early this year. Kurashiki and Mitsubishi Rayon Co. Ltd., will also make Vinylon filament yarn. Up to now Vinylon, a Japanese development, has been only in limited production. Dai Nippon Spinning Co. Ltd. will produce the staple form of the fibre at a new plant in Akabo City near Kobe.

New Epoxy Chemical Unit for Union Carbide

Facilities to produce more than 10 million lb. per year of epoxides and other oxygenated chemicals have been completed at the Institute, West Virginia, U.S., plant of Union Carbide Corporation. The unit is not yet producing at capacity, but production will increase gradually over the next few months. Among the new epoxy chemicals coming from the new facility are Epoxide-201 (3, 4-epoxy-6-methylcyclohexylmethyl-3,

4 - 6 - methylcyclohexane - carboxylate), Epoxide-206 (vinylcyclohexene dioxide), Epoxide-207 (dicyclopentadiene dioxide), and Flexol plasticiser EPO (epoxidised soybean oil). The company also plans to produce ε-caprolactone in the unit.

These diepoxides, and others planned for the future, have already demonstrated properties that will make them of importance in the epoxy resin field for plastics, coatings and adhesives.

With low-cost anhydride hardeners, Epoxide-201 forms resins with heat-distortion temperatures above 300°F (149°C) Epoxy plastics based on Epoxide-207 can withstand temperatures in excess of 570°F (299°C). The lowest viscosity diepoxide now commercially available is Epoxide-206.

Hetron Polyesters Resist Glacial Acetic Acid

Hetron 72 polyester resin, a chlorinated polyester developed by the Durez Plastics Division of Hooker Chemical Corporation at North Tonawanda, N.Y., is said to offer outstanding advantages in both temperature and chemical resistance when fabricated into such laminated products as storage tanks, piping, scrubbers, columns, ductwork, and similar processing units or plant equipment. During recent comparative tests, three glass mat-reinforced laminates based respectively on Hetron 72, on an experimental Hetron resin, and on Hetron 72 filled with approximately 2% graphite were exposed to glacial acetic acid under static conditions at 30-35°C. Virtually no loss in strength had been observed after 60 days.

Houdry's New Dabco Plant Lowers Commercial Price

A new commercial price schedule for Dabco (triethylenediamine), a catalyst for producing urethane foams, coatings and elastomers, has gone into effect after commercial start-up of a new Dabco plant in Paulsboro, N.J., for the Houdry Process Corporation, Philadelphia. The new unit, located adjacent to existing Houdry catalyst manufacturing facilities, has a capacity "adequate to supply a constantly growing demand for Dabco both here and abroad," (see also 'Trade Notes', p. 145).

Sodium Dispersions from U.S.

Sodium dispersions are now being offered by Acton Laboratories, 1180 Raymond Boulevard, Newark 2, N.J., as two standard products: sodium-naphthalene dispersion, crushed solids and 50% sodium in mineral oil. Samples are not available but orders can be placed for 1-lb. lots.

Titanium Project in Holland

The Billiton Co., The Hague, and the Albatross Sulphuric Acid and Chemical Works, Utrecht, have agreed in principle to form a company for the production of titanium pigment in Holland.

A factory is to be built in the Botlek area of the Port of Rotterdam, with an initial capacity of 10,000 tons of titanium dioxide a year, which will entail an investment of about Fl.30 million (£136,500). Know-how for manufacture will be supplied by the Glidden Co., U.S.

I.C.I.A.N.Z. Explosives Plant for New South Wales

It is reported that I.C.I. of Australia and New Zealand are to blast a man-made harbour from the cliffs of Bass Point, on the New South Wales coast, south of Sydney. An explosives works is planned there by I.C.I.A.N.Z. at a cost of £A3 million, and a harbour will also be necessary for the shipment of the products.

W. German Plant for Ethylene Oxide Catalyst

A plant for production of catalyst for ethylene oxide manufacture has been brought into operation at the Dormagen, West Germany, petrochemical works of the joint B.P.-Bayer-owned Erdölchemie GmbH concern. In January an ethanol plant, a second steam-cracker and a benzine hydrofining unit will then be brought into action. At present ethylene, propylene, ethylene oxide, propylene oxide, ethylene glycoles and propylene glycoles are produced at the Rhineside plant, with its ethylene annual output capacity of 45,000 tonnes.

Texas Gulf's View of World Sulphur Consumption

Chairman of Texas Gulf Sulphur, Mr. Fred M. Nelson, reports that world sulphur consumption in 1960 is expected to rise 5%—or about the same rate as 1959—due to high levels of business.

Mr. Nelson says world-wide consumption rose to a new high level in 1959 at 16,100,000 long tons against 15,247,000 in the previous year. In the U.S. consumption rose to 5,835,000 long tons from 5,255,000 in 1958. U.S. production had declined slightly to 6,110,000 long tons from 6,140,000 the year before.

New Phenol Unit at Shell Houston Plant

A new phenol unit, which recently went on stream at the Houston plant of the Shell Chemical Corporation, will supply the needs of both Shell Chemical and Shell Oil. A major portion of the output will be used in the manufacture of bisphenol-A, a principal ingredient of Epon (Epikote) resins and sold by Shell Chemical to manufacturers of epoxy and polycarbonate resins. Shell Oil will use part of the output in lubricating oil production and the recovery of aromatics such as toluene and benzene.

Benzene and propylene from the Houston refinery are used as raw material in the new phenol unit. In addition to phenol, the unit will produce acetone as a co-product.

U.S. Investments in Israel

U.S. industrial investor, Mr. Virgil Stark, president of 12 European and U.S. companies in the gas and petrochemical fields, is to send experts to Israel to work out the details of a new plan for building an integrated petrochemical industry there.

He made two suggestions to the Minister of Commerce and Industry. The first calls for using the gas discovered at Rosh Zohar directly in homes and industrial plants.

According to the second plan, Mr. Stark's interests are to build an integrated petrochemical industry in Haifa port, or in the port of Ashdod.

U.K. and U.S. Investment in Italy's Chemicals

IN 1959, the Italian chemical industry attracted a good measure of foreign investment, particularly in the pharmaceutical field. Rohm and Haas, Philadelphia, invested about Lire 160 million in Industrie Chimiche Filital set up in Milan to produce various chemicals, particularly fungicides.

Monsanto purchased a participation in Sicedison, Milan, investing Lire 6,000 million to launch an organic chemicals and plastics materials scheme.

Lever Gibbs invested Lire 500 million in Gibbs Italiana to expand the output of detergents and cosmetics and Lire 407 million in Van den Berg (Milan) to increase the output of margarine and to launch production of additional lines.

Imperial Chemical Industries and the Belgian Solvay invested, in all, Lire 350 million in Solvic Italiana to erect plants for the production of polymers and co-polymers of chloride and acetate of vinyl.

The U.S. Robertshaw Fulton Controls Co. financed the setting up of Robertshaw Italiana who will erect a factory at Bruzzolo, near Turin, for the production on licence of automatic thermostatic controls.

Abbott Laboratories of Chicago have expanded their investment in Abbott Italiana by further Lire 100 million to increase the production of medicinals and chemicals in general.

Cyanamid Italia were set up with 70% of the capital provided by American Cyanamid Co. and 30% by Alfar-Azienda Laboratori Farmaceutici. The programme of the new company envisages an expenditure of $4.8 million and incorporation of the existing Alfar's plants at Catania.

Boehringer have invested Lire 70 million in Boehringer Italiana (Milan), who are to produce medicines.

Parke Davis Italiana are building at Lainate, near Milan, a plant which will supplement the range of pharmaceutical products already produced by this company's factory in Rome.

Recently Phillips Carbon Black Italiana were set up to produce carbon blacks and to distribute chemicals manufactured by ANIC at Ravenna.

Cyanamid's Antibiotic and Chemical Plans for U.K.

AMONG the manufacturing facilities planned by Cyanamid International under their 1959-60 expansion programme are new units for the fermentation of antibiotics and the production of chemical specialities by Cyanamid of Great Britain Ltd.; a speciality chemical plant in West Germany and an insecticide and speciality chemical plant in Mexico.

The new Italian company, Cynamid Italia S.p.a. has just started operations. It was formed through the purchase of certain assets of Azienda Laboratori Farmacuetici S.p.a. (Alfar), including an operating pharmaceutical plant in Catania, Sicily. Alfar were previously licensees for Cyanamid's Lederle Laboratories Division.

Other countries where Cyanamid and their affiliates plan to expand existing capacities or construct new facilities include Argentina, Australia, Brazil, India, Japan, Pakistan, South Africa and Formosa.

Australia to Use Bacteria on Effluents

IT IS reported from Australia that plans are being made to use bacteria to treat noxious waste material from local gas, chemical and steel plants, using a method similar to that employed in septic tanks.

A low-cost treatment for ammonias, phenols and cyanides, perfected by the parent company in the U.K. of Simon-Carves (Australia) Pty. Ltd., will be embodied in treatment plants to be erected, the bacteria being cultivated in England, flash-frozen and flown to Australia.

The British company is reported to be breeding several types of bacteria, applicable to different effluents, and their use is said to be much cheaper than chemical treatment.

Nash and Thompson Acquire New Works

A SECOND factory has been acquired by Nash and Thompson Ltd. at Hook Rise, Tolworth, within 200 yards of their present research and production unit in Oakcroft Road, Chessington, Surrey. This new factory has increased the available space by 35,000 sq. ft. and the transfer of administrative departments, research and development and some production departments has now been completed.

Expansion was made necessary by the continued expansion of production and development during the last few years. More than 30 new instruments have been added to the range of standard instruments during the last two years. The company claim to be the only firm having a Government contract, now in the sixth year for the environmental testing of components to R.C.S.C. and similar standards. Other activities range from the manufacture of scintillator chemicals for the detection of radioactivity to the design and manufacture of a number of analogue simulators.

B.o.T. Revise Duty-free Imports of Dyestuffs Intermediates

NEW duty-free import procedures for dyestuffs intermediates, placing them in a similar position to other chemicals, are being introduced by the Board of Trade. The issue of duty-free directions as the normal method of relieving from import duty certain dyestuffs intermediates not obtainable in the U.K. is to be discontinued.

Relief from the import duty normally payable in respect of such dyestuffs intermediates will in future be granted by means of Import Duties (Temporary Exemptions) Orders. The first Order, which is now in preparation, will exempt the duty on a number of items for a period up to 30 September, 1960.

Any manufacturer who may be in a position to supply organic chemicals used in the manufacture of dyestuffs or of colouring materials for photographic use, may apply to the Board of Trade for a copy of the preliminary list of chemicals it is proposed to exempt from duty. Manufacturers who are members of the Association of British Chemical Manufacturers are being consulted through that body.

Any representations against the inclusion of any item should be made to the Board of Trade, Tariff Division, Horse Guards Ave., S.W.1, before 25 January.

Obituary

We report with regret the death on Tuesday of **Mr. William E. Dick**, 45, editor of *Chemistry and Industry* since June 1957. He had served on the editorial staff of CHEMICAL AGE, which he left to join *Discovery* in 1944. During his editorship of this journal, *Discovery* became widely recognised throughout the scientific world. Mr. Dick relinquished the editorial chair in 1956 on being appointed editor of *British Chemical Engineering*.

U.K. Dow Open E. Africa Sales Office

AN East African branch has been set up at Lullingham House, Queensway, Nairobi, by Dow Agrochemicals Ltd., 48 Charles Street, London W.1, with Mr. Douglas W. Thorne as East African representative. Sales operations will cover Kenya, Tanganyika and Uganda.

First Dow product to be marketed in East Africa will be Dowpon, the systemic, selective grass weedkiller, which controls couch grass, a limiting factor in African agricultural economy. Trials will be organised with Ruelene as an anthelmintic spray, and other agricultural chemicals in the Dow range are to follow. These will include soil and grain fumigants. The East African branch will also distribute Cuprovit, a copper oxychloride spray for coffee; Parathion and Metasystox, a systemic insecticide, for Farbenfabriken Bayer.

Dow Agrochemicals are the U.K. subsidiary of the Dow Chemical Co., U.S. At present the British company imports its agricultural chemical products from the U.S., but on completion this year of a £1 million factory at King's Lynn, Norfolk, will manufacture Dowpon for the U.K. and export to East Africa.

Removal of Import Duty Sought on Refined Borax

THE Board of Trade are considering an application for the removal of import duty on refined borax. The application covers the three grades of refined borax in normal commercial use (anhydrous, pentahydrate and decahydrate) and any other materials falling within the U.K. tariff definition: "*di*sodium tetraborate of a purity not less than 99% calculated on the anhydrous product".

A statement of the applicants' case will be made available to all firms and organisations with a *bona fide* interest in refined borax who wish to make representations, if they are prepared to give an undertaking to treat the information contained as strictly confidential and to allow their comments to be passed to the applicants for reply. Requests for a statement of the case, together with an undertaking, should be addressed in writing to the B.o.T. Tariff Division, Horse Guards Avenue, London S.W.1, not later than 2 February.

Du Pont, I.C.I. Experts Neutralise KCN Spillage

To neutralise some 100 lb. of potassium cyanide which scattered over the road through the village of Ashley Parva, near Lutterworth, Leics, on Tuesday, sodium hypochlorite was used as decontaminant after consultation with I.C.I.'s General Chemicals Division at Liverpool and Dr. Gordon Jenkins of Du Pont (United Kingdom) Ltd.

The cyanide was in one of three drums, each of 100 lb., which fell from a lorry and had been shipped from the U.S. parent company of Du Pont, E.I. Du Pont de Nemours and Co., and was on its way from London to Kidderminster.

Police were called when the drums were found and firemen mistakenly swilled the spilled cyanide from the road. A blocked drain caused cyanide to escape into a stream serving a farm. I.C.I. and Dr. Jenkins, who is Du Pont's technical and development representative in Europe, were called to assist in the decontamination.

PEOPLE in the news

● **Mr. H. E. Farmer,** secretary of Laporte Industries Ltd., Hanover House, 14 Hanover Square, London W.1, since October 1959, has been appointed to the board. Aged 45, he is a barrister-at-law, having been called to the bar in 1940. He is also an associate of the Chartered Insurance Institute with service in the insurance world. He joined Laporte Industries as assistant secretary to the company and its U.K. subsidiaries in June 1948.

● **Mr. Robert W. Ramsay,** a director and general manager of Evans Chemicals, Boreham Wood, Herts, has been appointed managing director.

● **Mr. L. O. Smith,** who has been general manager of the London branch of Parke, Davis and Co. since 1946, has been elected to the board of directors of Parke, Davis Inter-American Corporation Ltd. (Ontario).

● **Mr. J. T. Richmond** is to act as deputy general manager of Laporte Titanium Ltd., in addition to his existing appointment as research manager. **Mr. F. S. Clark** has been appointed site manager, battery works, Stallingborough, in addition to his existing appointment as engineering manager of the company. **Mr. D. J. Oliver** has been appointed a director and production manager in addition to his existing appointment as works manager, battery works, Stallingborough.

● **Mr. Douglas W. Thorne,** newly appointed East African representative of Dow Agrochemicals Ltd., 48 Charles Street, London W.1 (see p. 143), is vice-chairman of the Pesticide Chemicals Association of East Africa. He first went to Africa in 1947 as an administrative officer under the groundnut scheme. He has been associated with Desert Locust Control and before joining Dow was general manager of Fison's Pest Control (East Africa) Ltd.

● **Dr. Cyril Webber** has resigned his appointment as technical assistant to the managing director of the Shell Chemical Co. Ltd. to take up directorships with Yarsley Research Laboratories Ltd. and Yarsley Testing Laboratories Ltd., Chessington, Surrey.

A recent photograph of Dr. A. J. P. Martin, of Griffin and George Ltd., in his laboratory at Elstree. As stated in 'Chemical Age' 9 January, p. 79, Dr. Martin has been awarded the C.B.E. for his work on chromatography

● **Mr. R. W. Oxtoby,** manager of Evans Medical Ltd. for Mid-Africa and Asia, has left the country by air for a three months' tour of the Far East.

● **Mr. R. E. Huffam** has been appointed vice-chairman of A. Boake, Roberts and Co. (Holding) Ltd., and also a director and vice-chairman of A. Boake, Roberts and Co., the former company's main subsidiary. Mr. Huffam succeeded Sir H. Manzoni as president of the British Standards Institution in October 1958; and joined the board of A. Boake, Roberts in April 1959. He had been with the Unilever Group ever since joining Joseph Crosfield and Sons in 1913. (He was appointed chairman of Lever Brothers Port Sunlight Ltd., in 1930.) After winning the M.C. in the 1914-18 war, he became assistant works director of Crosfield's in 1919, and was appointed to a directorship in 1924.

R. E. Huffam, who becomes vice-chairman of A. Boake, Roberts and Co. (Holding) Ltd.

● The Borough Polytechnic has made the following appointments: Senior lecturer in charge, division of metal science, **Mr. G. Isserlis, B.Sc., A.I.M.;** senior lecturer in food technology, **Dr. D. B. Smith, B.Sc., Ph.D., A.R.I.C.;** lecturer in chemical engineering, **Mr. S. N. Houldsworth, M.Sc., A.R.I.C.;** lecturer in physical chemistry, **Dr B. E. Weller, B.Sc., Ph.D.;** assistant lecturer in organic chemistry, **Dr. R. J. Phillips, B.Sc., Ph.D.**

● **Mr. Edwin E. Hewitt** has been appointed sales engineer of Nash and Thompson Ltd., Hook Rise, Tolworth, Surbiton. Previously a specialist in ultrasonic flow detection techniques at Cossor Instruments, he is now responsible for the Nash and Thompson sales of the Kovo polarographs and electron microscope throughout the U.K., plus metallurgical, electronic test equipment, process control, medical and survey instruments in Essex, Middlesex, Herts, Suffolk, Norfolk, Cambridge, Hunts, Beds, Bucks, Oxford, Gloucester, Shropshire and Wales.

● **Mr. A. T. Rogers,** technical director and chief engineer, and **Mr. R. F. Jennings,** technical director, have been appointed directors of Huntington, Heberlein and Co. Ltd., a subsidiary of Simon-Carves Ltd.

● **Mrs. Vivienne D. Johnson,** a director of Detel Products Ltd. since 1949, has been appointed managing director. She has been with the company for 20 years, being secretary since 1941.

● **Dr. J. I. M. Jones, M.Sc., D.S.C., F.R.I.C.,** technical manager and research director of Crookes Laboratories Ltd., has been re-elected chairman of the Biological Methods Group of the Society for Analytical Chemistry. Also re-elected is **Mr. J. S. Simpson, F.I.M.L.T.,** vice-chairman, who is senior microbiologist with Glaxo Laboratories Ltd.; and hon. secretary and treasurer is **Mr. K. L. Smith, M.P.S.,** Standards Dept., Boots Pure Drug Co. Ltd., at Nottingham.

● **Mr. A. Wormald,** aged 47, commercial director of Fisons Ltd. from 1950, and formerly managing director of the company's Chemical Division, is one of two managing directors of the parent board of Fisons Ltd. which became a holding company on 1 January. In addition to his duties as a managing director of the holding company, Mr. Wormald is in executive charge of the company's principal non-fertiliser interests, i.e. Fisons Pest Control Ltd., Genatosan Ltd., Whiffen and Sons Ltd., Benger Laboratories Ltd., and Fisons Chemicals (Export) Ltd. His special interests are business organisation, especially the integration of scientific research into industry, and the application of the methods of economic research to business problems. A firm supporter of European Unity, both political and economic, and of closer relations with Soviet Russia, he speaks all the principal languages including Russian. The other managing director of Fisons Ltd. is **Mr. John Watson Napier,** aged 53, who also becomes the first chairman and managing director of Fisons Fertilisers Ltd. He is a former president of the Fertiliser Manufacturers' Association.

A. Wormald, joint managing director of Fisons Ltd.

Duke to Visit Tin Research Institute

The Duke of Edinburgh will visit the headquarters and laboratories of the Tin Research Institute at Greenford on 16 March.

TRADE NOTES

Dabco Catalyst Price Cut

Due to increased demands Houdry Process Corporation have reduced the prices of their Dabco catalyst (triethylenediamine) for one-shot urethane foams with effect from 1 January. Jacobson van den Berg and Co. (U.K.) Ltd., 3-5 Crutched Friars, London E.C.3, have issued a new price list showing prices ranging from 80s delivered for 1 to 4 lb. lots in 1 lb. amber glass jars to 63s 6d per lb. delivered for 500 lb. aluminium-lined Leverpak fibre drums.

Formaldehyde Determination

A new page has been added to Tintometer Ltd.'s text book 'Colorimetric chemical analytical methods' for formaldehyde; and new Lovibond discs are also added to the range. Particulars from the Colour Laboratory, Waterloo Road, Salisbury.

Industrial Plastics

Polypenco Ltd., manufacturers of engineering industrial plastics, of 68-70 Tewin Road, Welwyn Garden City, Herts, announce appointment of Mr. S. Sharp as their sales engineer for North Eastern counties, Yorkshire, Northumberland and Durham. Area office address is Nab Wood Drive, Shipley, Yorks.

Further Shell Price Cuts

In line with recent price changes announced by Shell Chemical Co. Ltd. for ethylene oxide derivatives, two more products, Oxitol (ethylene glycol mono ethyl ether) and isopropyl Oxitol (ethylene glycol mono isopropyl ether) have been reduced by approximately £10 and £5 a ton respectively, from 6 January. The Oxitol range of solvents is widely used in the surface-coating, plastics and pharmaceutical industries and the derivatives now reduced in price represent the two most important products in the glycol ether market.

Phthalic Anhydride

A colour brochure describing properties and uses of phthalic anhydride has been issued by Monsanto Chemicals Ltd., Monsanto House, Victoria Street, London, S.W.1. The brochure also deals with health hazards of the material, and treatment in the event of accident.

Changes of Address

Allied Colloids Ltd. have moved their southern sales office to 2 The Green, Richmond, Surrey (Richmond 6425), due to inability to expand at the previous premises in Great St. Thomas Apostle, Queen Street, London E.C.4.

Rhoden Partners Ltd., design and development engineers in mechanical and production engineering, have moved to larger premises at 19 Fitzroy Square, London W.1 (Euston 9696).

BX Plastics Products

A new colour-printed booklet describing and illustrating the Cobex rigid vinyl products manufactured by BX Plastics Ltd., Higham Station Avenue, London E.4, is now available. Among items listed are a 65 ft. transparent tower; safety goggles; and a fume cupboard.

Continuous Tiling

An exhibition has been arranged by Corrosion Ltd., of Southampton, to take place at the Midland Hotel, Manchester, from 15 to 19 February. Its purpose is to acquaint local interests with advantages of the company's continuous tiling system for walls and ceilings. The London address of the firm is 16 Gloucester Place, W.1.

Abril Industrial Waxes

Owing to rapidly increasing demand for high melting waxes, in powder form, Abril Industrial Waxes Ltd., Golden Mile Works, Bridge End, Glam., have had difficulties in maintaining prompt deliveries. New plant has been installed to enable the company to meet the pressure of demand and to provide wax powders with a more even particle size distribution, centred on 75 microns (B.S.S. 200).

New Lubricant

Diversey (U.K.) Ltd., whose range of industrial chemicals is now being distributed by Deosan Ltd., 42-46 Weymouth Street, London W.1, have introduced a new lubricant for conveyor systems in bottling plants, breweries, dairies and food-processing and handling plants generally. This is marketed under the name of Dicolube SL.

DIARY DATES

MONDAY 18 JANUARY

C.S.—Cambridge: University Chemical Laboratory, Lensfield Rd., 5 p.m. 'Chelatometry' by Dr. T. S. West.

C.S. with R.I.C.—Leeds: Chemistry Lecture Theatre, University, 6.30 p.m. 'Aromatic fluorocarbons', by Prof. M. Stacey.

R.I.C.—Enfield: Technical College, Queensway, Ponders End, 7 p.m. 'Recent advances in glass technology', by Dr. D. K. Hill.

Soc. Cos. Chemists—London: R.S.A., John Adam St., W.C.2. 7.30 p.m. 'Use of polyoxyethylene derivatives in cosmetics', by B. A. Killner.

S.C.I.—London: 14 Belgrave Sq., S.W.1, 5.30 p.m. 'Lipid isobutylamides', by Dr. L. Crombie.

S.C.I.—London: 14 Belgrave Sq., S.W.1, 5.30 p.m. 'Chemistry of a group of natural insecticides', by Dr. L. Crombie.

TUESDAY 19 JANUARY

C.S.—Cambridge: University Chemical Laboratory, Lensfield Rd., 11.30 a.m. 'Analysis of microgram amounts of organic compounds', by Dr. T. S. West.

Inst. Petroleum—Manchester: Engineers' Club, Albert Sq., 6.30 p.m. 'Drums old and new', by S. S. Walde.

Plastics Inst.—London: Wellcome Building, Euston Rd., N.W.1, 6.30 p.m. 'Plastics in the packaging industry', by Dr. G. Swift.

WEDNESDAY 20 JANUARY

C.S. with R.I.C.—Norton-on-Tees: William Newton School, 8 p.m. 'Development and uses of the patent system', by R. T. Swarbrick.

I.Chem.E.—Leeds: Lecture Theatre A., Houldsworth School of Applied Science University, 6.30 p.m. 'Refrigeration practice', by Mr. Perry.

O.C.C.A.—London: 26 Portland Pl., W.1, 7 p.m. 'An appreciation of work study', by G. L. Cooper.

Plastics Inst.—Newcastle upon Tyne, Eldon Grill, Grey St., 7 p.m. 'Chromatographic analysis', by M. Rutter.

R.I.C.—London: Science Museum, Exhibition Rd., S.W.7, 6 p.m. 'Thirty centuries of assaying', by F. Greenway.

S.A.C.—London: C.S., Burlington Hse., Piccadilly, W.1, 7 p.m. 'Antibiotic assays in body fluids', by Prof. L. Garrod.

THURSDAY 21 JANUARY

C.S.—Bristol: Chemistry Dept., University, 5.15 p.m. Lecture by Prof. D. H. Everett.

C.S. with R.I.C.—Sheffield: Chemistry Dept., University, 4.30 p.m. 'Some recent studies with natural products', by Prof. E. R. H. Jones.

C.S. with R.I.C.—Aberystwyth: Edward Davies Chemical Lab., University College, 5 p.m. 'Chemistry of pyrozoles', by Dr. I. L. Finar.

C.S. with R.I.C. and S.C.I.—Aberdeen: University Union, 8 p.m. 'Synthetic detergent washing powders', by L. N. Savidge.

S.C.I.—London: 14 Belgrave Sq., S.W.1, 6 p.m. 'Plastics for building', by D. B. Honeyborne.

S.C.I.—London: Battersea College of Technology, Battersea Park Rd., S.W.11, 6.30 p.m. Conversazione of Corrosion Group.

FRIDAY 22 JANUARY

Glasgow: Chemistry Dept., The University, 4 p.m. 'Energy transfer in gases', by Prof. T. L. Cottrell.

Market Reports

HOME DEMAND WELL SUSTAINED

LONDON Home demand for industrial chemicals has been well sustained during the past week, and there has also been a steady flow of inquiry for shipment.

Activity has been widely spread over most sections of the market and buying interest has extended beyond immediate requirements. A renewed interest in fertilisers has been in evidence with fair quantities of compound fertilisers going into consumption.

Prices generally have remained steady but a number of adjustments have been made in the quotations for the non-ferrous metal compounds. Higher basis prices are operating for white lead, red lead and litharge while copper sulphate is slightly up at £80 15s per ton. Zinc dust is £5 per ton dearer, the superfine grade being quoted at £137 per ton for 2-ton lots.

There has been little change in the position of the coal tar products. Naphthalene continues in good request and refined tar is moving well on home account and for shipment.

MANCHESTER Satisfactory trading conditions have been reported this week in most sections of the Manchester market for heavy chemicals, with industrial users calling for steady deliveries against contracts of the soda products and most other bread-and-butter lines. Additional inquiries are circulating fairly well. Shipping business in a wide range of chemicals is well maintained. As regards prices the undertone generally is steady. In the fertiliser section there is a continued steady demand for basic slag, with a fair trade passing in the compounds and in superphosphates.

SCOTLAND Conditions generally have been rather quieter during the past week in the Scottish heavy chemicals market due to the New Year holidays. However, some improvement was noted towards the latter end of the week when a more active position prevailed, and it is hoped soon for a return to normal trading conditions. There has been little change in prices which mostly remained firm.

NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sales Branch), 25 Southampton Buildings, Chancery Lane, London W.C.2, price 3s 6d including postage; annual subscription £8 2s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection 24 February

Process for the production of ceramic products. Etablissements R. Gasquarl la Chimie Industrielle S.A., Des. **828 749**

Production of α-α-spiro-heptamethylene-succinic acid amide. Badische Anilin- & Soda-Fabrik AG. **828 753**

Reaction products of gamma lactones with polyamines. General Aniline & Film Corp. **828 665**

Process for stabilising oil-extended rubber. Bataafsche Petroleum Maatschappij N.V., De. **828 666**

Oxaozilidinediones and process for preparation. U.S. Vitamin Corporation. **829 048**

Method of making polymer films. American Machine & Foundry Co. **828 977**

Metal-containing polyazo dyestuffs. Sandoz Ltd. **828 668**

Floating containers for transporting liquids. Esso Research & Engineering Co. **828 669**

Preparation of esters of amino acids and of peptides from proteins. Armour & Co. **828 978**

Non-metallic ferromagnetic materials having a rectangular hysteresis cycle. Lignes Telegraphiques et Telephoniques. **828 756**

Thiophosphoric acid esters and a process for their production. Farbenfabriken Bayer AG. **828 671**

Recovery of organic products from waste gases. Badische Anilin- & Soda-Fabrik AG. **828 674**

Process for making mixed fertilisers containing ammonium nitrate and calcium carbonate. Commercial Solvents Corp. **828 675**

Phosphatised hydroxy fatty acids or their esters, and emulsions and dispersions of the water-in-oil type. Grindstedvaerket A.S., **829 050**

Bis-sulphonyl ureas and a process for their production. Cilag Ltd. **828 987**

Preparing 6-azauracil and its 5-alkyl-substituted derivatives. Spofa, Spojene Farmaceuticke Zavody, Narodni Podnik. **828 988**

Amino-substituted triphenylethylenes and preparation thereof. Sterling Drug Inc. **828 762**

Polymerisation of acetylenically unsaturated hydrocarbons. Bataafsche Petroleum Maatschappij N.V., De. **828 989**

Pyrazolone carboxylic acid derivatives. Merck AG., E. **829 054**

Pharmaceutical preparations. Frosst & Co., C. E. **829 055**

Processes for producing adherent coatings on aluminium and aluminium alloys. Aluminium-Waltzwerke Singen GmbH. **828 677**

2-Amino-halobenzoazoles, and salts and compositions thereof. McNeil Laboratories Inc. **829 164**

Separating into its constituents an aqueous mixture of a lower aliphatic alcohol, a lower monocarboxylic acid and the ester thereof with the lower aliphatic alcohol. Usines ed Melle. **829 058**

Pressure hydrogenation of crude oils, tars or their residues. Badische Anilin- & Soda-Fabrik AG. **828 679**

Catalysts of phosphosulphurisation reactions. Esso Research & Engineering Co. **829 064**

Medicine for reducing cholesterol level of the blood. Lilly & Co., E. **828 766**

Thermal treatment of polyethylene. Union Carbide Corp. **829 065**

Production of terpolymers. Union Carbide Corp. **828 993**

Manufacture of silica glasses. Quartz & Silice. [Addition to 783 244.] **829 070**

Process for the spinning of cellulose triacetates. Sov. Rhodiaceta. **829 071**

Production of ethylene polymers. Soc des Usines Chimiques Rhone-Poulenc. **828 996**

Production of carboxylic acid esters. Badische Anilin- & Soda-Fabrik AG. **828 876**

Production of filaments fibres and films of regenerated cellulose. Vereinigte Glanzstoff-Fabriken AG. **829 174**

Upgrading light virgin naphtha. Esso Research & Engineering Co. **828 879**

Method of producing very pure silicon or germanium. Kali-Chemie AG. **829 175**

Diamine compounds and means of producing same. Parke, Davis & Co. **829 176**

Phosphorane compounds and a process for the manufacture thereof. Hoffmann-La Roche & Co., F., AG. **828 999**

Production of high octane motor gasoline. Bataafsche Petroleum Maatschappij N.V., De. **829 072**

Method and apparatus for the thermal fission of hydrocarbons. Bergwerksgesellschaft Hibernia AG. **828 772**

2-Amino-1-(3, 4-methylenedioxyphenyl)-propane isomers, and an ataractic preparation containing 2-amino-1-(3, 4-methylenedioxyphenyl)-propane. Smith, Kline & French Laboratories. **828 880**

Reaction products of the cyclo-octatetraene synthesis. Badische Anilin- & Soda-Fabrik AG. **829 074**

Union-dyeable fibre blends. Dow Chemical Co. **829 075**

Process for printing textile materials with vat and sulphur dyestuffs. Badische Anilin- & Soda-Fabrik AG. **829 177**

Separation of isomeric disubstituted aromatic compounds. Esso Research & Engineering Co. **828 777**

Process for producing phosphatic fertiliser. Lummus Co. [Divided out of and addition to 828 891.] **828 892**

Production of fertilisers. Jourdon, C. H. [Representative of Arnold, J.C.] (Facerform Co.). [Divided out of 828 881.] **828 882 & 828 883**

Open to Public Inspection 2 March

Preparation of uranium trichloride. Copenhafer, D. T. **829 491**

Water repellant compositions containing synthetic resins. Snell, Inc., F. D. **829 621**

Process of removing rare earths from aqueous uranium solutions. U.K. Atomic Energy Authority. **829 639**

Method of carbonisation. Minister of Power. **829 498**

Define polymerisation catalysts and olefin polymerisation processes involving same. Petrochemicals Ltd. **829 626**

Production of filaments, threads, fibres and the like from viscose. Harbens Ltd. **829 499**

Water distributing systems in water-cooling towers. Cooling Towers Ltd. **829 555**

Production of high molecular weight polyethylenes and compositions suitable for use as catalysts therein. Ziegler, R. [Addition to 801 031.] **829 627**

[Addition to 799 392.] **829 628**

Insecticidal compositions. Food Machinery & Chemical Corp. **829 556**

Synthesis of steroids. Olin Mathieson Chemical Corp. **829 632**

Preparation of high molecular weight materials. Montecatini Soc. **829 559**

Process for producing mixed fertilisers and products thereof. Lummus Co. **829 489**

Concentration of lactan oils. Leuna Werke W. Ulbricht Veb. **829 405**

Bonding rubber to polyurethane. Lord Manufacturing Co. **829 564**

Production of microporous diaphragms, vessels, tubular retainers and the like. Pritchett & Gold & E.P.S. Co. Ltd. **829 305**

Foaming detergent compositions. General Aniline & Film Corp. **829 701**

Process of and apparatus for the gasification of fuels. Rummel, R. **829 410**

Nickel-copper base alloys and glass moulding elements made therefrom. Mond Nickel Co. Ltd. **829 684**

Adsorption of organic vapours. Imperial Chemical Industries Ltd. **829 413**

Glutarimides and process for their manufacture. Ciba Ltd. **829 415**

Purification of secondary butyl alcohol. Shell Research Ltd. **829 424**

Process for producing a needle-like coke. Great Lakes Carbon Corp. **829 196**

Preparation of metallo-organic compounds. Union Carbide Corp. **829 574**

Producing silicon of high purity. Standard Telephones & Cables Ltd. **829 421**

Producing semiconductor materials of high purity. Standard Telephones & Cables Ltd. [Cognate application 10 513.] **829 422**

Electrodeposition of chromium. Diamond Alkali Co. **829 429**

Steroids. Merck & Co. Inc. **829 679**

Organic phosphorous compounds, process for their manufacture and preparations containing them. Ciba Ltd. **829 576**

Storage and shipping of liquefied gases. Esso Research & Engineering Co. **829 206**

Manufacturing pure aromatic substances from industrial hydrocarbons mixtures. Leuna- Werke W. Ulbricht Veb. **829 432**

Disposal of noxious gases containing nitrogen oxide fumes. Du Pont de Nemours & Co., E. I. **829 581**

Phenothiazine derivatives. Sterling Drug Inc. **829 433**

Purification of 4,4'-dihydroxy-diphenylalkanes and cycloalkanes. Farbenfabriken Bayer AG. **829 207**

Merocyanine dyes. Ilford Ltd. **829 644**

Anion exchange resins and method of preparation thereof. Chemical Process Co. **829 696**

Manufacture of salt. Murgatroyd's Salt & Chemical Co. Ltd. **829 211**

Low temperature emulsion polymerisation of unsaturated compounds. Hercules Powder Co. **829 213**

Burning of gypsum. Bögardts, E. **829 652**

Phenol ethers of vitamin B_{12}—factor HI. Aschaffenburger Zellstoffwerke AG. **829 439**

Esters of polymeric hydroxyl compounds and boric acid. Shell Research Ltd. **829 634**

Treatment of ferrous metals. Union Carbide Corp. **829 658**

Light-sensitive compositions for use in the manufacture of photographic materials. Imperial Chemical Industries Ltd. [Addition to 718 404.] **829 704**

Polymethine dyes. Ilford Ltd. **829 584**

Polymerisation catalysts. Imperial Chemical Industries Ltd. **829 440**

Masking compositions. Libbey-Owens-Ford Glass Co. **829 709**

Colouration process for textile materials. Imperial Chemical Industries Ltd. **829 443**

Antibiotic designated narcomycin and process of making same. Lilly & Co., E. **829 327**

Azetidinones. Lepetit S.p.A. **829 663**

Barbiturate anaesthetics. Aspro-Nicholas Ltd. **829 355**

Method and apparatus for dividing plastics substances by volume. Unilever Ltd. **829 591**

Method of making ceramics and product thereof. Corning Glass Works. **829 447**

Cobalamin producing fermentation process. Distillers Co. Ltd. [Cognate application 24 482.] **829 232**

2-Substituted 3-methyl-2, 3-dihydroxyhexenes-(5). Abildgaard, K. [trading as Lovens Kemiske Fabrik Ved. A. Kongsted]. **829 451**

Polymerisation of olefins. Ethyl Corp. **829 596**

Curing rubbery copolymers. Esso Research & Engineering Co. [Addition to 799 193.] **829 598**

Colour control of liquids. Proctor & Schwartz Inc. **829 458**

Electrolytic coating on articles of magnesium or magnesium base alloys. Canadian Industries Ltd. **829 716**

Perfluorocarbon polymers and polymer compositions and processes for preparing same. Du Pont de Nemours & Co., E. I. **829 600**

Polymerisation of methacrolein. Du Pont de Nemours & Co., E. I. **829 601**

Preparation of organomagnesium chlorides. Metal & Thermit Corp. **829 243**

Producing alumina. General Motors Ltd. [Cognate application 36 293.] **829 602**

Production of unitary vat dyestuffs of the anthraquinone series. Badische Anilin- & Soda-Fabrik AG. **829 699**

Polytetrafluorethylene fine powder. Du Font de Nemours & Co., E. I. **829 503**

Perfluoroalkylphenothiazine derivatives. Smith Kline & French Laboratories. **829 246**

Chemical reactor. Klauder Weldon Giles Machine Co. **829 505**

Pharmaceutical preparations of quarternary ammonium compounds. Wellcome Foundation Ltd. [Divided out of 824 853.] **829 507**

Manufacture of nitrogen-containing derivatives of benzene carboxylic acids. Inventa AG. **829 251**

Cross-linking vinyl chloride polymers. Dow Chemical Co. **829 512**

Curing rubbery copolymers. Esso Research & Engineering Co. **829 515**

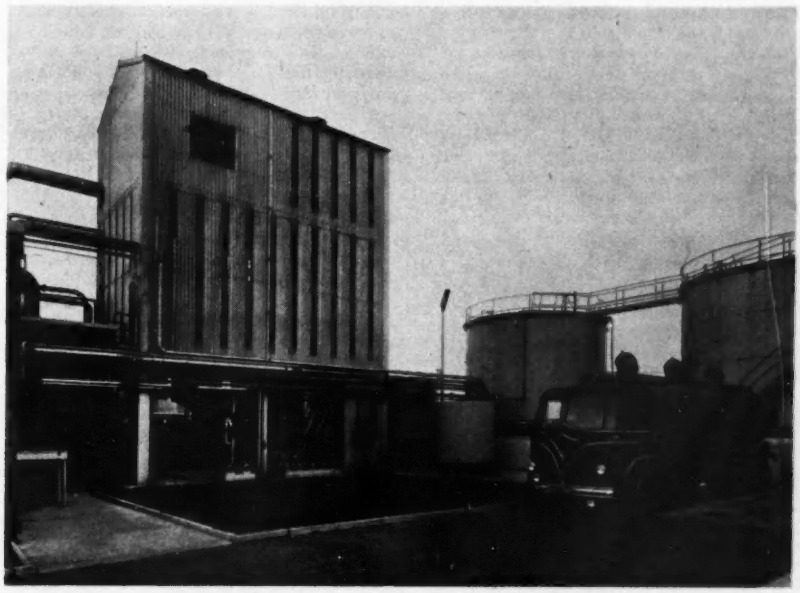
Steroid compounds. Pfizer & Co. Inc. **829 260**

FORMALDEHYDE PLANT

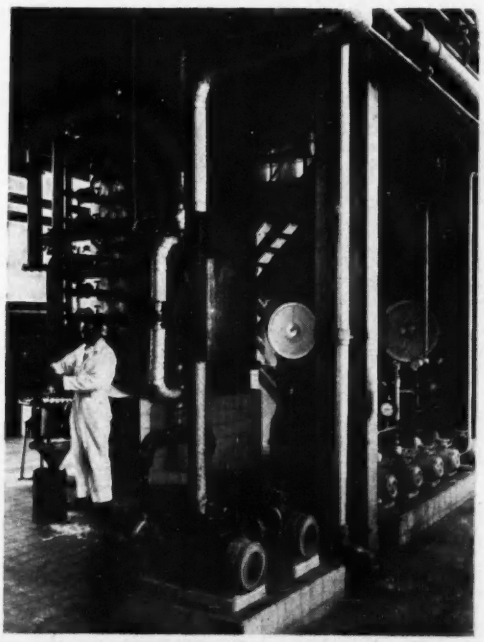
for

B.I.P. CHEMICALS LTD.

LEONARD SMITH (ENGINEERS) LTD. were entrusted with the engineering, design, construction of the Formaldehyde Plant described in this journal and supplied to B.I.P. Chemicals Ltd. The process is one of several developed by **Leonard Smith (Engineers) Ltd.** in this and other fields.



Photographs by courtesy B.I.P. Chemicals Ltd.



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Commercial News

Courtaulds Ltd.

The offer made by Courtaulds Ltd. for the Ordinary capital of Pinchin and Johnson Associates amounts to some £16.6 million at current closing prices on the Stock Exchange.

Directors of Pinchin and Johnson are reported to have stated that accepting holders will receive an income at least equal to that which they have received recently from shares held and Courtaulds have authorised a statement that P. and J. intend to pay a final dividend of 7½%, making a total of 12½% for the year (9%). (See Distillates, p. 134.)

Hickson and Welch

All the capital of Richardson and Starling, specialists in remedial treatment of buildings, has been purchased by Hickson and Welch (Holdings) Ltd., 8 Buckingham Palace Gardens, London S.W.1.

Chemische Werke Hüls AG

Turnover of the Marl, West Germany, chemical producer, Chemische Werke Hüls AG for 1959 will be in the region of DM 600 million, or some £50 million. In the 1958 financial year the concern achieved a total turnover of DM 578.4 million (about £48.2 million). Excluding turnover of synthetic rubber and butadiene, sales in as much of 1959 as can at present be checked, are 10% higher than that for the same period of 1958; in its turn, 1958 turnover was 10.6% up on 1957. Share of exports in the Chemische Werke's total sales is expected to have remained in 1959 at the previous year's level of 34%. Turnover on plastics rose by 19% over the year, the introduction of such new products as low-pressure polythene meeting with particular success.

A sum of about DM 80 million (about £6,835,000) is expected to have been invested by the company over 1959. A good financial result is anticipated for the year. For the C.W.H.-associated concern Bunawerke Hüls turnover rose steadily in 1959. The projected monthly output level of 3,750 tonnes was reached and, in the last quarter of the year, overtaken. A further considerable raising in capacity is exected by the second quarter of the current year. Since the start of production by Bunawerke in 1958 with one type of 'cold' rubber, the production programme has increased by another five rubber types and two types of 'cold' rubber latex.

Società Edison S.p.A.

The biggest private company in Italy, Società Edison S.p.A., is to place the Lire 50,000 million (some £28 million) decided on in March of last year to finance the company's expansion in the fields of petrochemical, atomic power and synthetic fibre production, and in other industrial branches. The loan is made up of Lire-5,000 lots to be sold at Lire 4,950; it carries 5.5% interest and has a duration of 20 years, starting 1 February 1962. It is expected in bourse circles to be subscribed immediately.

Scotland (Pentland) Fertilisers

The firm of Scottish (Pentland) Fertilisers Ltd. of 39 Palmerston Place, Edinburgh, has been registered as a private limited company with a capital of £100 in £1 shares. The directors are J. Crozier, L. S. B. Scott, J. Macfarlan, and W. A. M. Gill. The company is marketing Pentland concentrated compound fertiliser, a new product which has been given a strong sales launching.

Sir A. Todd will Open O.C.C.A. Exhibition

SIR ALEXANDER TODD, F.R.S., professor of organic chemistry at Cambridge and chairman of the Advisory Council on Scientific Policy, will be guest of honour at the exhibition luncheon to be held at the Criterion Restaurant, London, in connection with the twelfth technical exhibition of the Oil and Colour Chemists' Association to take place at the Royal Horticultural Society's New Hall, London S.W.1.

Dates set for the exhibition, which Sir Alexander is to open, are 15, 16 and 17 March; there will be no charge for admission, or for the official exhibition guides. Further information may be obtained from the general secretary, Wax Chandlers Hall, Gresham Street, London E.C.2.

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Further particulars and forms of application may be obtained from the Registrar, Bradford Institute of Technology, Bradford, 7.

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The proprietor of British Patent No. 646916, entitled "IMPROVEMENTS IN OR RELATING TO SULPHUR", offers same for licence or otherwise to ensure practical working in Great Britain. Inquiries to: Singer, Stern & Carlberg, 14E. Jackson Blvd., Chicago 4, Illinois, U.S.A.

The proprietor of British Patent No. 757698, entitled "AERATING APPARATUS AND METHOD PARTICULARLY FOR FROTH FLOTATION PROCESSES", offers same for licence or otherwise to ensure practical working in Great Britain. Inquiries to Singer, Stern & Carlberg, 14 E. Jackson Blvd., Chicago 4, Illinois, U.S.A.

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